

WESTERN INDUSTRY



Industry's growth in the West never stops. Crane operator at work on a big steam generating plant. For details see page 5.

THIS ISSUE: Conserving Water Supplies by Industrial Waste Disposal; Increased Production Use of Conveyors; Incentive System Cuts Accident Costs; How to Stay Ahead of Bad Business Weather; Retirement Plan Increases Efficiency; Earning Profits in Our Export Market

Five Cents

VOLUME XIII

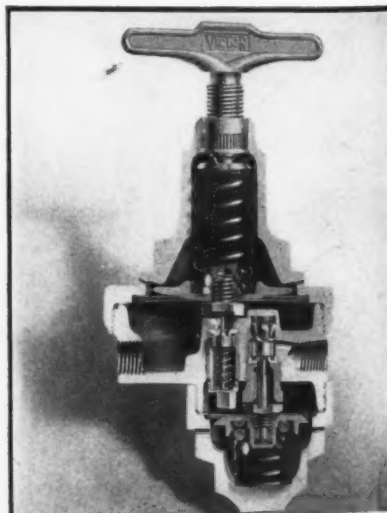
NUMBER 8

September, 1948



Made by **VICTOR**

proper control of gas pressures safeguards gas or compressed air operated tools and, when welding or cutting torches are involved, fine pressure reducing regulators conserve gases and safeguard operators. single or two-stage reduction regulators for all types of cylinder gases or cylinder manifolds . . . for very small or very large hourly gas volume . . . are made by victor . . . and it's more than a slogan that victor welding and cutting equipment costs less to own and to operate. victor equipment company, san francisco 7, calif.



what's under the hood is what makes the automobile go...what's inside of a regulator determines its true value.

Another ANACONDA EXTRUDED SHAPE

Another SHORTCUT TO A FINISHED PRODUCT

Time and again, manufacturers in many branches of industry have reported on the production advantages made possible by using an Anaconda Extruded Shape to replace an intricately formed or hard-to-make part.

One report comes from the H. S. Getty Co., Inc., of Philadelphia, prominent manufacturer of *extruded* butt hinges for marine joiner and contract builders' hardware. Let's take the 3½" Getty Button Tip Hinge illustrated as an example:

Supplied in long mill lengths by The American Brass Company, the extruded shape is first cut into hinge blanks of required size (A); then slots are milled and pin holes are drilled in the knuckles (B); next, the leaves are drilled and countersunk for screw holes (C); and finally, the nested leaves are fitted for assembly (D).

The result? A simplified shop production routine that eliminated several costly machining and finishing operations—because the extruded shape has the exact cross-section of the finished hinge. And, because of the dimensional accuracy of extruded shapes, each part is instantly adaptable to drill jigs and milling fixtures. Best of all, these extruded hinges are a precision product . . . rustless, better-looking, competitively priced and hence more readily marketable.

Remember, extruded metal is *wrought* metal . . . tough, strong, dense-grained, smooth-surfaced and easy to machine. If the production possibilities of extruded shapes look promising to you, send us a sketch, sample or description of the part you have in mind. We'll be glad to tell you about costs . . . and possible *savings*, too.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

About the Extrusion Process . . .

An electric furnace billet of copper, brass, bronze or special copper alloy is heated to an accurately predetermined temperature and inserted in an extrusion press. Tremendous pressure is then applied by an hydraulic ram. Plastic resistance of the billet is overcome and the metal is squeezed through the die, conforming to the die shape in the minutest detail.



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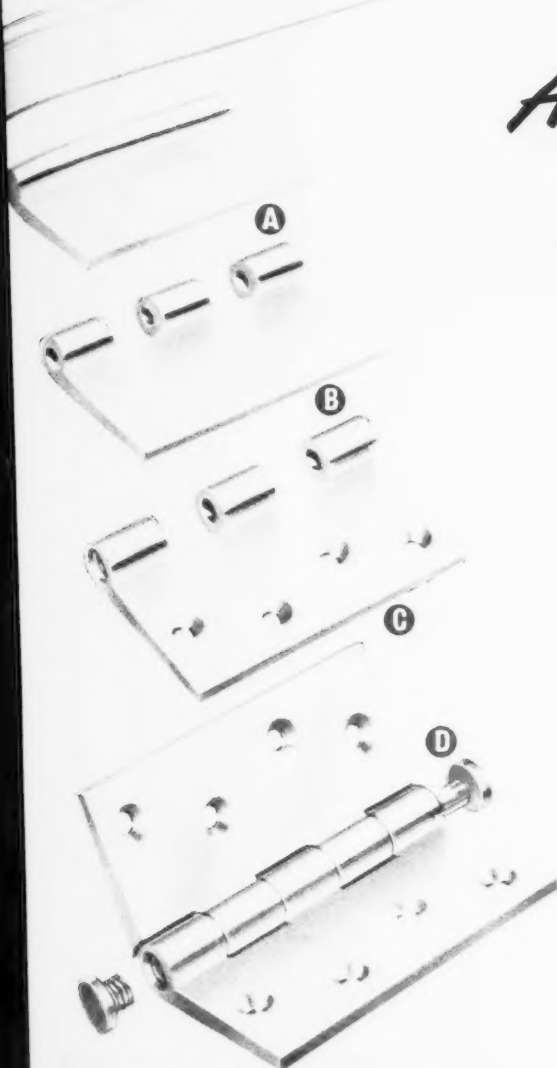
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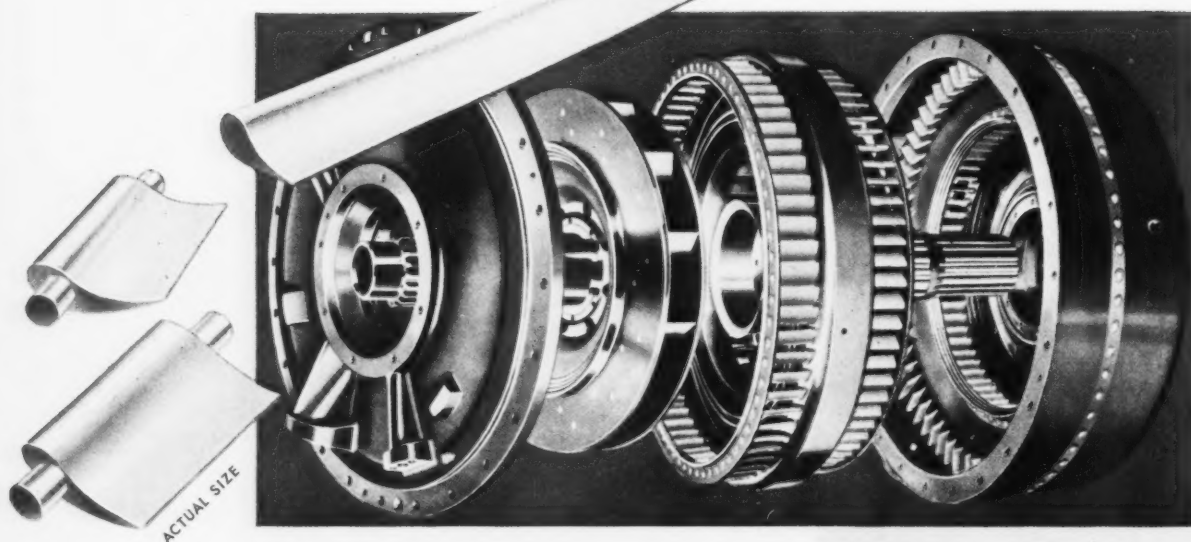
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258 EXTRUDED BLADES

deliver turbine-smooth power through
this Hydraulic Torque Converter



SEVERAL forward strides in the automotive field have been made through the development of the Spicer Hydraulic Torque Converter. These include: (1) Smooth and rapid acceleration, through hundreds of horsepower, by simply stepping on the gas pedal. (2) Greater passenger comfort, less wear and tear, and longer engine life due to reduced vibration. (3) Elimination of strain and fatigue on the driver caused by continuous clutching and gear shifting—particularly on buses and trucks.

This torque converter built by Spicer Manufacturing Division, Dana Corporation, Toledo, Ohio, has been accepted as a highly efficient and practical transmission unit and is now in volume production. A brief explanation of its operation appears at the right . . . where it becomes evident that the brunt of the power is borne by 258 high-strength, turbine-like blades of Anaconda Brass.

A lot of engineering went into the development of precise form and facial curvature of these blades—which are cut from long mill lengths of Anaconda Extruded Shapes—each blade having the dimensional accuracy and surface smoothness of the die through which it was extruded.

Extruded Brass is a readily machinable metal, so trunnions are quickly milled on both ends of the blade. Being a tough metal, too, the trunnions are riveted to the rotor or stator for keeps . . . each blade in the exact location and at the correct angle.

This is a new application for Anaconda Extruded Shapes . . . thousands of similar shapes, in copper and various copper-base alloys, are in daily use. A brief description of their method of manufacture appears on the preceding page.

And this is the way it works . . .

The pump of the Spicer Hydraulic Torque Converter is driven by the engine. Operating on the principle of a turbine, a large volume of fluid, at very high speed, is forced against the first set of blades of the driven rotor. This first set of blades reverses the direction of the oil and forces it through a set of stationary blades in the housing. The oil is again reversed, and this process is repeated through a second set of rotary blades—a second set of stationary blades—and then a third set of rotary blades, after which the fluid is returned to the pump.

An idea of the force delivered can be gained from the fact that the flow, at times, reaches a rate of 5,000 gallons a minute—almost two large barrels every second!

40110

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General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd.,
New Toronto, Ontario



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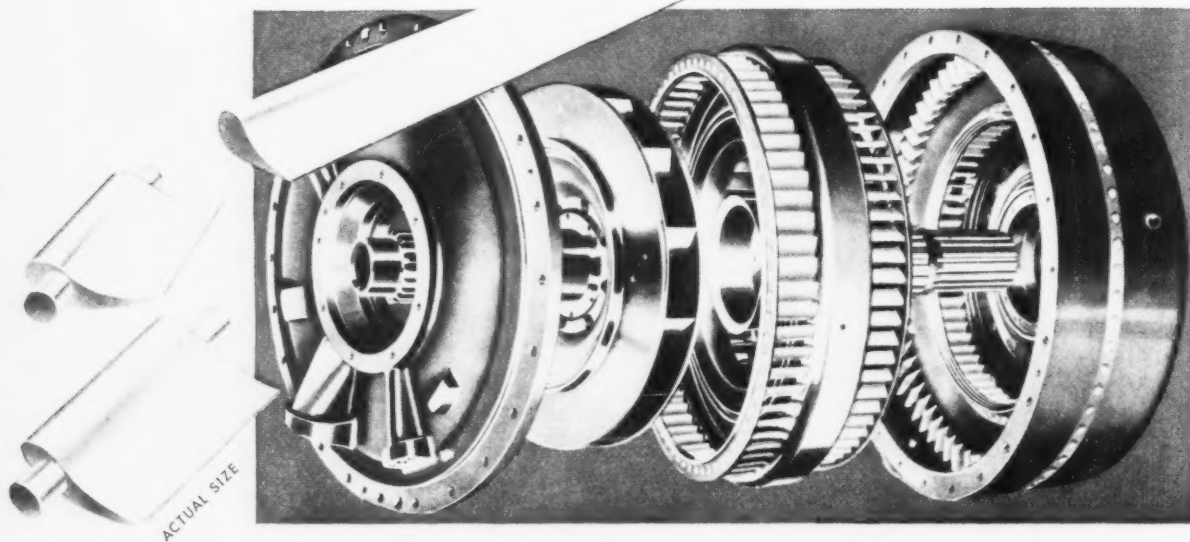
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Front Cover

Nothing typifies the growth of the West better than this picture of a crane operator on construction of the Los Angeles Department of Water & Power 335,000 kilowatt steam generating plant at Wilmington, needed because building in Los Angeles for first seven months of 1948 was up over \$100,000,000 from last year.

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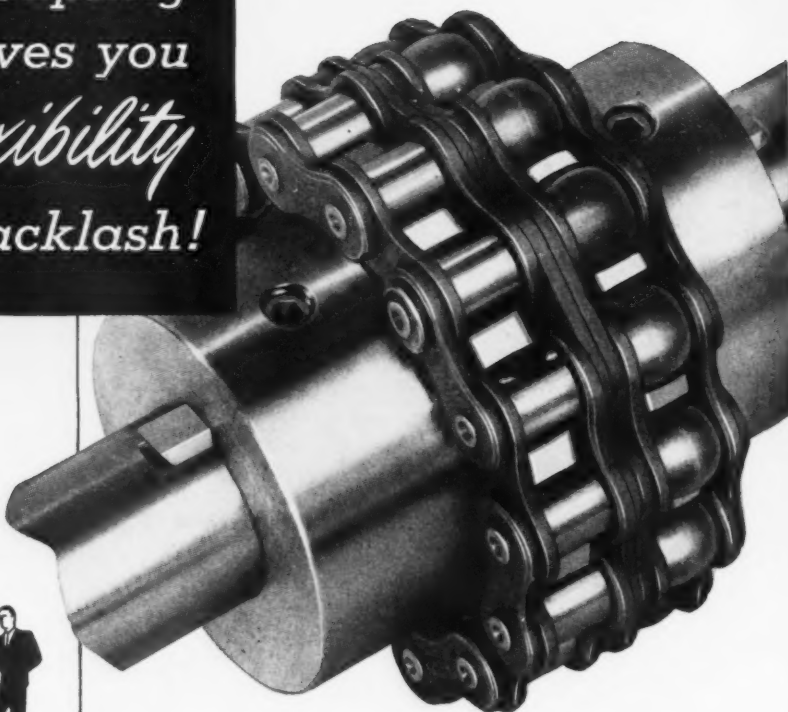
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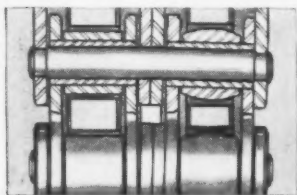
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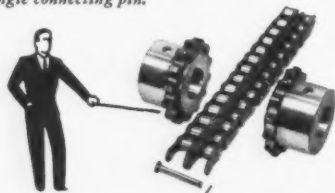
this Coupling
gives you
True flexibility
without backlash!



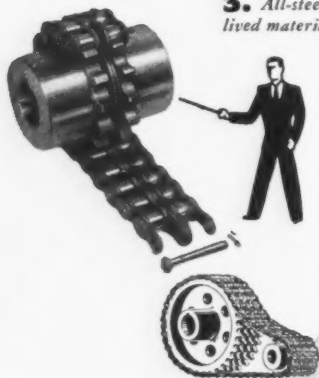
1. True flexibility...maximum shock-absorbing ability because pins bend.



2. Easily installed or disconnected with single connecting pin.



3. All-steel. No short-lived material.



● Baldwin-Rex Tru-Flex Couplings give you true flexibility without destructive backlash. These efficient chain couplings with their exclusive convex rollers on one chain strand give you better all-round performance . . . more protection for your machines . . . longer service. Here's why:

The convex rollers maintain only line contact with sprocket teeth and because of this contact, pins are designed to flex or bend. The flexing of the pin, plus the inherent flexibility of roller chains, accommodates misalignment, allows end play, and absorbs greater torsional shock loads. Too, this design permits the chain to be fitted snugly around the sprockets as contrasted to the "sloppy fits" of ordinary chain couplings. This, plus the fact that no short-lived materials are needed to give flexibility, makes it easy to see why Tru-Flex Couplings will give you longer, more efficient service.

For all the facts on Tru-Flex Couplings . . . how their single pin construction makes installation and disconnecting easy without an axial shift of either shaft . . . how they dampen pulsating loads . . . and their many other features, send for your copy of Bulletin No. 48-6 Address Baldwin-Duckworth Division of Chain Belt Company, 352 Plainfield Street, Springfield 2, Mass.

BALDWIN-REX

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BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

Shell scientists answer questions
about the extra values in

SHELL X-100 MOTOR OIL



Q. How is this motor oil different?

A. It is different in make-up . . . and purpose.

Q. Different in make-up?

A. Shell X-100 Motor Oil starts with a particularly high-grade base oil. To this, special fortifying agents are added, several of them newly developed by Shell research. These are "X" safety factors that protect oil against chemical change . . . keep oil clean . . . minimize rust, engine wear and oil consumption.



Q. What about the difference in "purpose"?

A. Shell X-100 Motor Oil is specifically designed for extreme conditions. The "X" safety factors, in fact, exceed the demands of the hardest kind of sustained, high-speed driving.

Q. When should Shell X-100 Motor Oil be used?

A. Check the kind of service you put your passenger cars and light trucks to. Shell X-100 Motor Oil may seem more than you need for ordinary driving—but the extra margin of safety is mighty good to have at any and all times.

Q. Is it for all gasoline-powered equipment?

A. Yes—and Shell X-100 Motor Oil is at all Shell stations and depots. Or ask your local Shell representative.

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?

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MPANY

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Cleveland Fasteners mean
something Important to you



CLEVELAND
Top Quality
FASTENERS

The Cleveland Cap Screw Company

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TWX CV42

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2. SERVICE

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3. PRICING

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4. SPECIALIZATION

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Per Man with . . .**

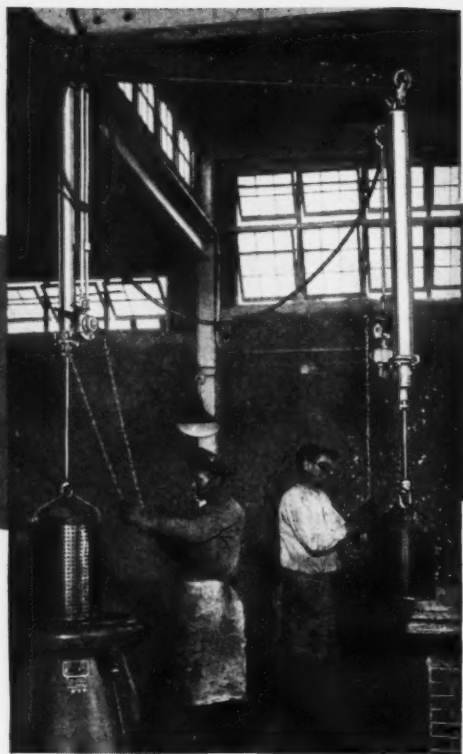
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Wherever a lifting, pulling or pushing operation is involved, CURTIS Air Hoists save time and labor; cut load-handling costs.



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- Pendant, bracketed or rope-compounded types

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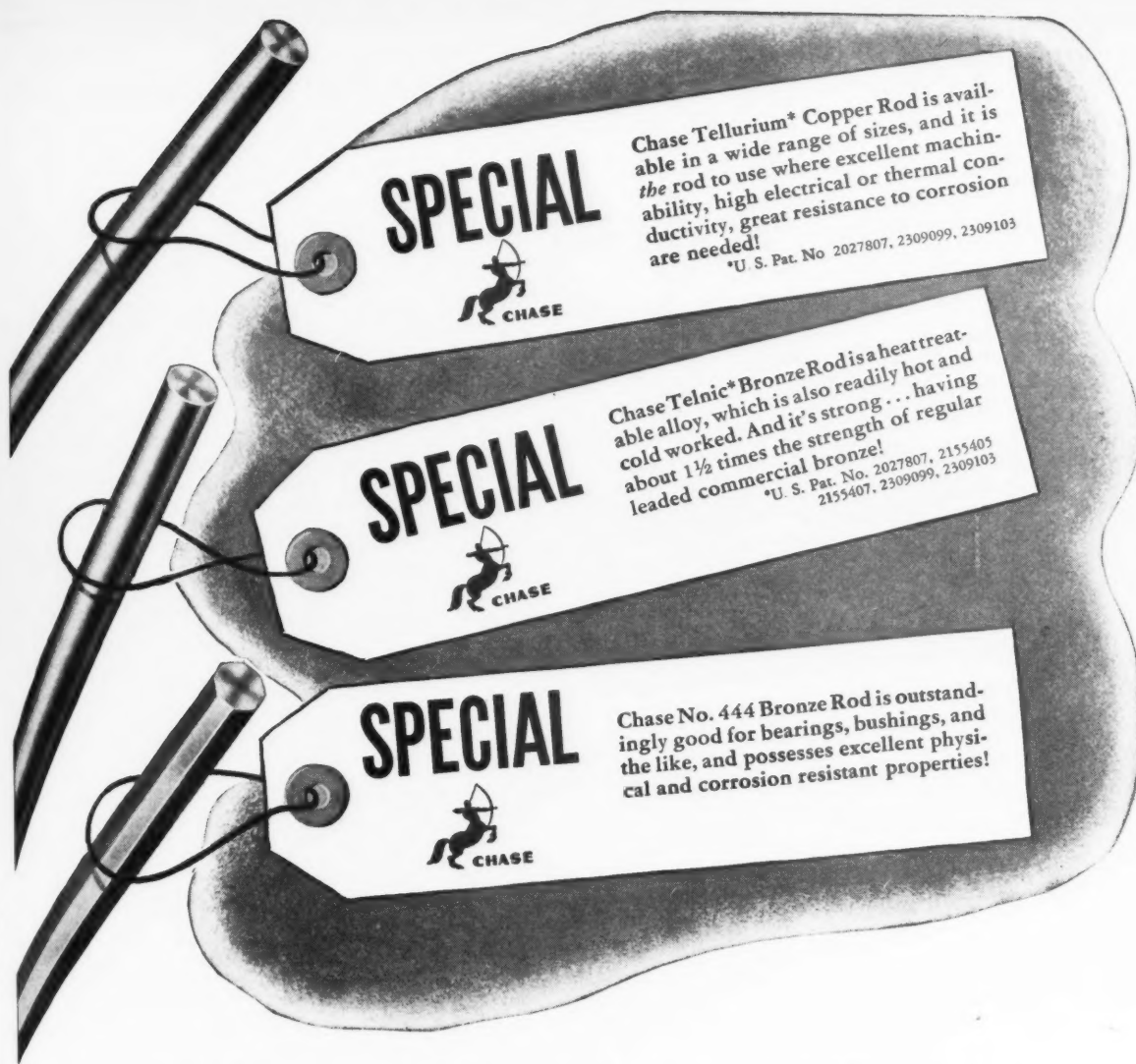
94 Years of Precision Manufacturing

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Chase Tellurium* Copper Rod is available in a wide range of sizes, and it is the rod to use where excellent machinability, high electrical or thermal conductivity, great resistance to corrosion are needed!

*U. S. Pat. No. 2027807, 2309099, 2309103


SPECIAL



Chase Telnic* Bronze Rod is a heat treatable alloy, which is also readily hot and cold worked. And it's strong... having about 1½ times the strength of regular leaded commercial bronze!

*U. S. Pat. No. 2027807, 2155405, 2155407, 2309099, 2309103

SPECIAL



Chase No. 444 Bronze Rod is outstandingly good for bearings, bushings, and the like, and possesses excellent physical and corrosion resistant properties!

For those tough jobs...3 Chase Special Alloy Rods ...made to see you through

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Chase

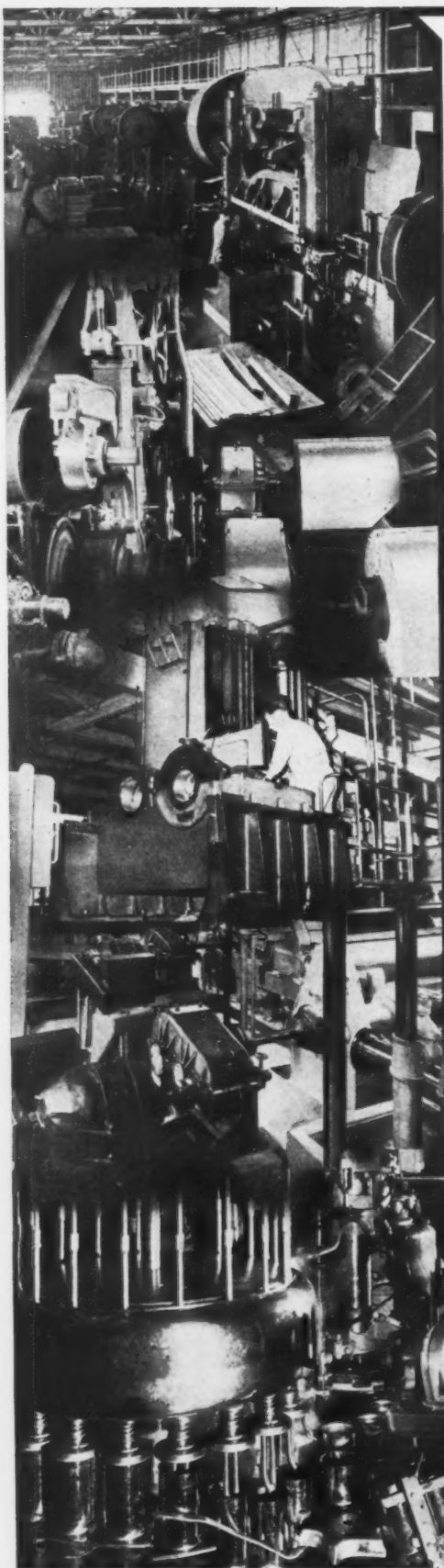


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AUTOMATIC TRANSPORTER



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Every day, more and more companies are discovering the faster, safer and more economical way to handle materials. They are giving the job of lifting, hauling and stacking to the efficient battery electric truck. Time is being saved . . . more tons moved per man per hour. Handling costs have been cut as much as 50%. And more storage space is being utilized by high tiering.

When electric trucks are powered with dependable Exide-Ironclad Batteries, they keep on the job day after day . . . and all day long.

The unique construction of Exide-Ironclad Batteries results in all four of the vital characteristics of a storage battery: *high power ability, high electrical efficiency, ruggedness and long life.*

Speed up your material handling. Cut handling costs. Put Exide-Ironclad Batteries and Battery Electric Trucks to work in your plant.

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DEPENDABLE POWER



1888 . . . Dependable Batteries for 60 Years . . . 1948

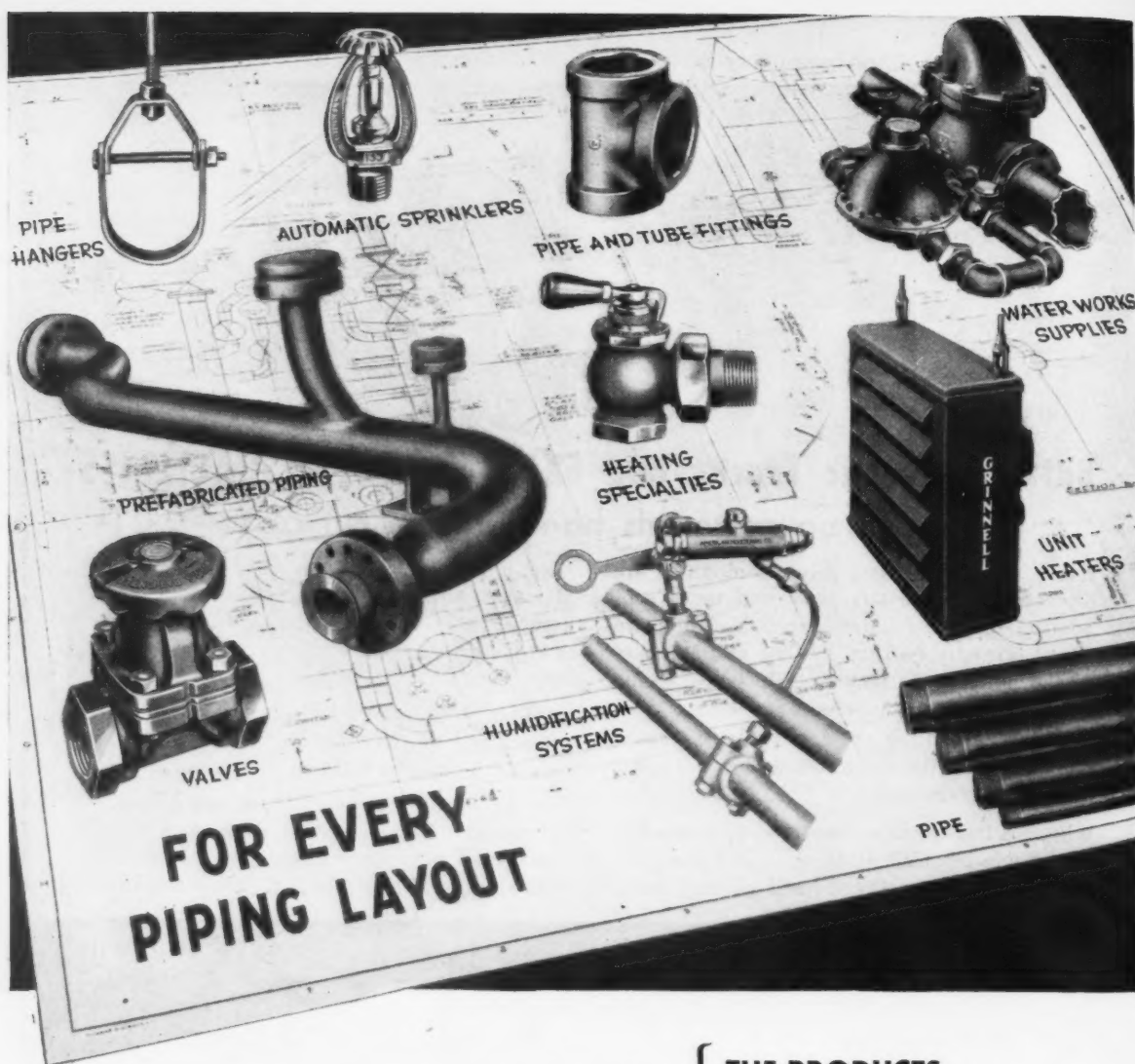
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LOS ANGELES

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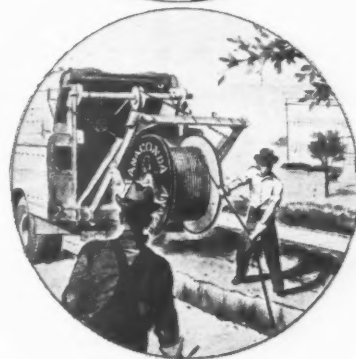
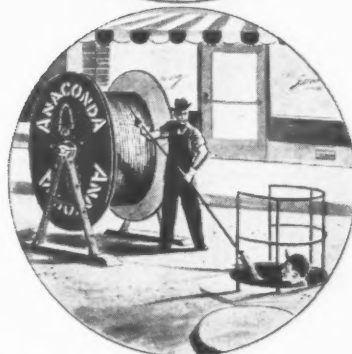
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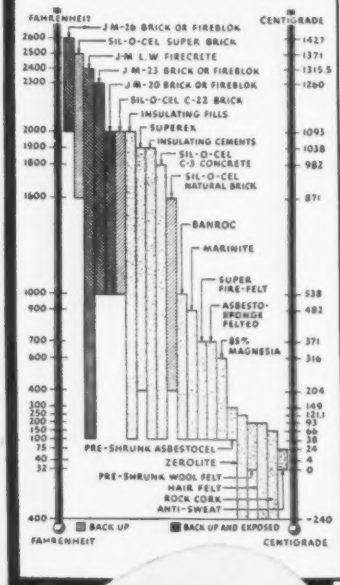
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Facts about J-M Insulations Subject: MATERIALS

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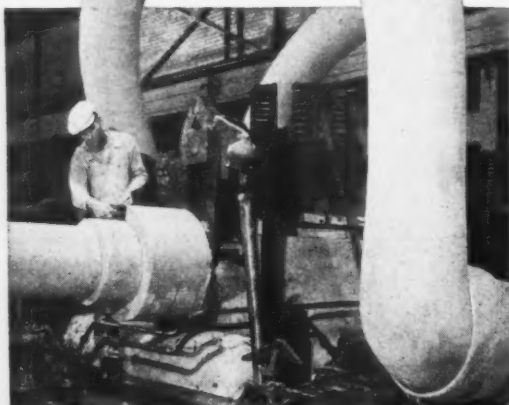
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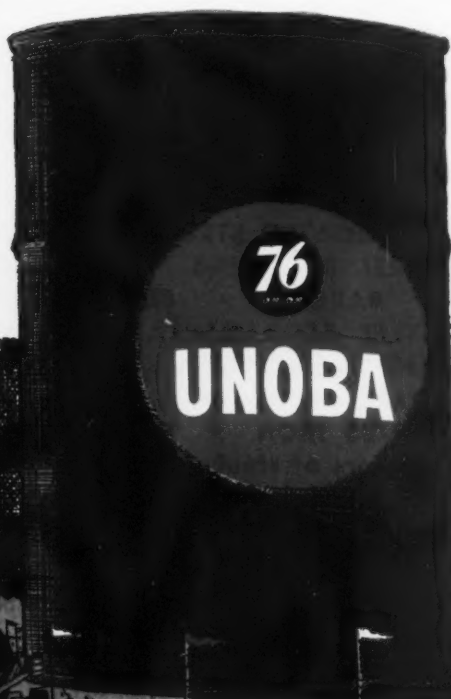
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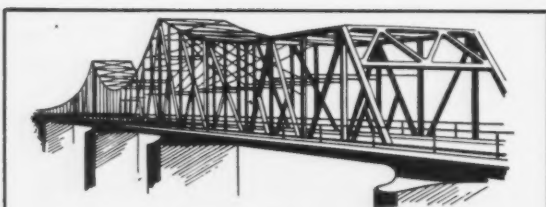
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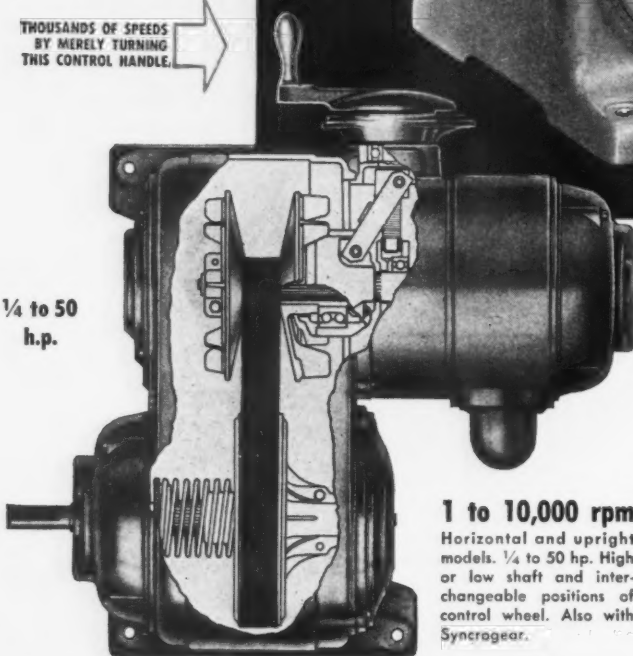
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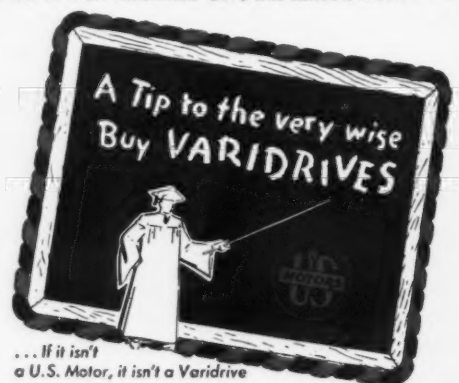
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a U. S. Motor, it isn't a Varidrive

In Our Mail Box

Ford Parts Program

Editor, *Western Industry*:

In line with the established policy of the Ford Motor Company I expect to terminate my service with the company by retirement October 1st. Fred G. Rumball, who is at present associated with me, will be in charge of this office after the above date.

The supervision and promotion of our company's buying program on the Coast during the past two years has been both interesting and inspiring and has offered us, we think, opportunities to render service beneficial not only to individuals, but also to industry and the state of California as well.

Perhaps my greatest personal satisfaction in this work has come from the feeling that what we are attempting to do was definitely constructive; that the benefits would be of an expanding type and should grow in volume during the years to come.

Little can be accomplished by the individual without friendliness and cooperation from others. From the beginning of this program you have constantly supported the writer and our organization in the work that we have been attempting to do and I am sure that you, too, can derive considerable satisfaction from the fact that a start has been made in the industrialization of the West. May I take this opportunity to express to you and your organization my thanks and sincere appreciation for the opportunity of having worked with you in the promotion of our mutual interests.

L. C. DISSER
West Coast Purch. Rep.
Ford Motor Co., Los Angeles.

Manufacturers' Agents

Editor, *Western Industry*:

There is a special phase in which you may be interested at this moment, which we call "The Distribution Trend Toward Manufacturers' Agents."

Since the late war, with many sales organizations badly disrupted, with high inflationary costs of rail and air travel, telephone and telegraph, hotel accommodations, meals, and all sundry items, coupled with top salesmen's salaries in most localities, manufacturers are being forced to look more and more to manufacturers' agents, handling a number of related but non-competing accounts for an economic and profitable distribution of their products and services.

Thus, many old salesmen or sales engineers are becoming new manufacturers' agents, or old manufacturers' agents are being importuned to take on new accounts, and this wide conversion movement is fraught with many pitfalls for all concerned.

Manufacturers' Agents National Association, a national association of manufacturers' agents organized last year and chartered this spring as a non-profit corporation, has attracted wide and favorable attention and interest among manufacturers' agents and representatives, sales and selling agents, export and import agents, brokers and commissionmen, as well as manufacturers themselves, in all parts of the country, as a result of the recent wide distribution of an attractive and informative 20-page Information Booklet from our Western field office at 542 South Broadway, in Los Angeles.

All firms joining before August 31 will be charter members, entitled to be so known and recognized. There is no initiation fee, and annual dues are to be quite small.

P. EDWIN THOMAS, Exec. Sec.
Manufacturers' Agents Natl. Assn.
Los Angeles, Calif.

(Continued on page 23)

EDITORIAL COMMENT

Plain Talk About Housing

HATS off to Congressman Walt Horan of Washington, member of the House Appropriations Committee, for some plain talk about housing in particular and the general fallacy of looking on the Federal government as an inexhaustible Christmas tree. He says:

"Uncle Sam is broke. It cannot be repeated too often, in the midst of this vogue of demanding Federal 'aid' for every possible thing, that nearly every state in the Union, including all the 'poor' ones, had a cash surplus in its treasury, while the Federal government is more than \$252,000,000,000 in debt. It can well be argued that most of these problems can be met by the states—if their local officials will use the courage and initiative necessary to do the job, instead of waiting for the Federal government to act.

"In the case of the proposed Federal housing program, most of the 'aid' would go right back into the wealthier states whose big cities present the worst housing problems. I have yet to see why these wealthier states should add a 15 per cent Federal overhead to the expense of building homes there, when their own taxes will pay for it. If, as they claim, private builders can't meet the need, why doesn't the city or state government, either of which has a better balance sheet than Uncle Sam, step in and do the job?

"How to get houses. If it is true that housing costs too much, will the Federal government serve its people by subsidizing the exorbitant cost? Or would it be better to discourage the unfair trade practices which result in high prices and at the same time try to guarantee the individual sufficient income to be able to pay a fair price for a home? Will family life and the dignity of the individual be enhanced by making thousands more of them the tenants of a paternalistic government?"

Appealing to Intelligence

CAMPAIGN oratory is not going to solve the grievous problems of inflation, shortages of materials, differences between management and labor, the bearing of our foreign policy on domestic business, and various other postwar puzzles. Nor is any one political party going to solve them merely by virtue of its party label or its platform. Nor can it be expected that all wisdom, initiative and discretion will emanate from the White House, whoever may become its occupant next year.

Congress is the place where much, if not most, of the spade work must be done, and the deciding factor in attacking today's baffling problems will be the amount of information the members of Congress have in their possession. News letters in *Western Industry* over a period of years have pointed out time and again that in general they are sincere, earnest, honest men of average intelligence. The familiar saying about the voters "Never underestimate their intelligence, or over-estimate their information," applies equally well to members of Congress.

Consequently industry in the West has a responsibility that should not be shirked of transmitting to its senators and congressmen its reasoned thinking on the main questions of the day. Not a selfish demand for more "bacon" (or pork, to put it more plainly) to be brought home, because in far too many instances this merely adds to the general tax load, since each region in the country is equally insistent on so-called "benefits" for itself. Instead, this transmitting of information should be of views as to what will most benefit the community and country in the long run.

In our opinion, one of the best ways to do this job would be to call all the candidates for Congress from each area, whatever their party, to a sort of round-table where they would listen while industry discussed the various situations frankly. The cause of most of these problems lies far beyond the influence of any political party and their solution will not depend so much on party labels as on the individual mental grasp of each member of Congress.



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MAIL BOX—(Continued from page 21)

Coordinating Sales and Production

Editor, *Western Industry*:

We enjoyed reading the article by Mr. Harry R. Lange, vice-president of Cutter Laboratories, Berkeley, California.

Yes, we too have a system whereby we closely coordinate production and sales. In addition to a committee, such as that mentioned by Mr. Lange, separate forecasts of sales are made by our sales statistical department and our general statistical department. Entirely different factors are taken into account in each instance, but it is amazing to see how closely the forecasts agree when submitted by both departments.

One thing which we have tried to do is to prevent our sales forecast and our effort at coordination from becoming cumbersome and complicated. We believe that we have succeeded in doing this very nicely.

JOHN J. KASSENBRICK
Manager, Norwich Pharmacal Co.
Los Angeles, Calif.

More Welding Comment

Editor, *Western Industry*:

I would make the following comments on Mr. Varney's article on loss of arc time on d.c. welders:

1. Substantial savings in power can be made through the use of a control such as Mr. Varney's company manufactures.

2. The idle power consumption given may apply to some makes of welding machines, but it is too high for our make under average conditions. Therefore, the saving with Lincoln equipment would be considerably under the 57 per cent figure given in the article.

3. His average figure of 20 per cent actual arc time seems low to us. This, however, is merely an opinion and he undoubtedly has facts to back up his statement.

S. H. TAYLOR
Western Manager
The Lincoln Electric Co.
Emeryville, Calif.

Everybody on the Team

Editor, *Western Industry*:

Regarding the article in your July issue about the experience of the Washington Water Power Company, I found it most interesting. I think their program is very progressive and very much "on the beam," particularly their use of employee questionnaires, the monthly meetings of a few rank and file employees with top management, and their overall effort to make each employee feel that he is a member of the team.

A. R. BAILEY
Vice-President
Coast Counties Gas & Electric Co.
San Francisco, Calif.

Shale Drilling Program Planned in Colorado

Diamond core drilling operations will be carried on this summer by the Union Oil Company of California and the Pacific Oil Company, a Standard Oil Company of California subsidiary, northwest of Rifle and Grand Valley, Colorado. Working in conjunction with the U. S. Bureau of Mines, some 11 holes are scheduled in efforts to determine the extent and character of western Colorado's immense shale deposits. Exploration will be carried on by the oil companies on properties they hold in the area.

For Dependability

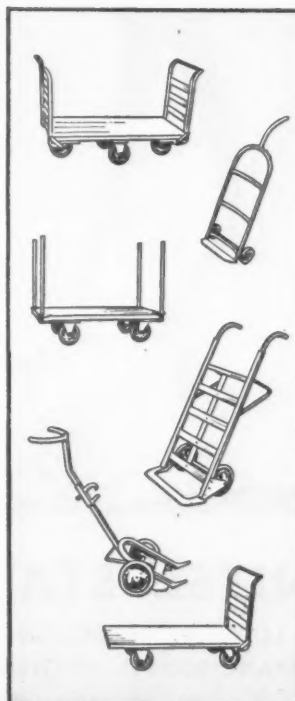


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UNITED STATES STEEL

THE WESTERN OUTLOOK...News...Statistics...

1

California manufacturing employment reaches all-time high, 52% above June, 1940; Sales of department stores above December peak; Bank loans and demand deposits trend upward; Aluminum production cut by shortage of power; Oil drilling operations up 40% from last year; Defense program will take about 5% of Western steel tonnage; Furniture trade brisk

Employment Picture

EMPLOYMENT in general throughout the West continued in a healthy condition during the past 30 days, with manufacturing keeping pace with the more seasonal groups such as lumbering, fishing and agriculture. California, for example, reached a peacetime record in the number of production workers in manufacturing, when an estimate by the Division of Labor Statistics and Research reported 472,000 persons so employed, a gain of 13,900 since May. This is 2 per cent above a year ago, and 52 per cent above June 1940.

Probably no state in the West typifies the change and industrial growth so much as Arizona. Never regarded as a center for much beside agriculture and mining, and long thought of as the place where activity practically halted during the hot summer months, Arizona's state employment security commission proudly announced that 153,700 persons were employed in non-agricultural pursuits during June, an increase of 6.7 per cent over a year ago. Construction showed the greatest gain in the past 12 months, followed by primary metals, transportation, excluding railroads, and general merchandise and apparel. Manufacturing is showing a steady growth, as noted last month. Sharpest contrast is in the construction field, where for hundreds of years Arizona Indians made adobe blocks by hand from clay and water and

straw. Now a firm in Phoenix is making adobe bricks by machine, half the size and weight of the old type, and capable of supporting three times the pressure.

A report just published by the Bureau of Labor Statistics of the Department of Labor contains some interesting figures on the growth of Western wage and salary

up except in those industries seriously affected by labor disputes. In the eight mountain states, employment went from 145,700 in 1947 to 147,400 in 1948; in the three Pacific states the total was off slightly. April 1947 employment was 985,500, and in the same month this year it was 980,600. Washington showed a gain of 5,000, but Oregon, hit by floods, dropped about the same number, and California lost about 4,500. The report of the California Department of Industrial Relations calls attention to the increases that have occurred since the April figures referred to were released from Washington — the May-June rise in both durable and non-durable goods industries reflects in part the termination of work stoppages in several industries, the report states, and partial recovery in the apparel industry following a post-Easter slump. Other important factors were the sharp employment rise in the automobile industry and continued seasonal expansion in lumber operations. If the aircraft and shipbuilding industries in which employment was cut substantially during the past year are excluded, the factory force in all other manufacturing industries this June was approximately 20,000 or 5 per cent above a year ago.

Commerce and Banking

An average increase in expected carloadings in Pacific Coast Transportation Advisory Board territory of 9.4 per cent for the third quarter is reported, with cotton, salt, automobiles and

(Continued on page 27)

CONSUMERS' PRICE INDEX

From Bureau of Labor Statistics
100=5 yr. avg. 1935-39

	Los Angeles	San Francisco	Portland	Seattle	Denver
Oct. 15	166.5	166.5	166.5	166.5	166.5
Nov. 15	166.5	166.5	166.5	166.5	166.5
Dec. 15	168.9	168.9	168.9	168.9	168.9
Jan. 15	167.6	167.6	167.6	167.6	167.6
Feb. 15	168.1	168.1	168.1	168.1	168.1
March 15	167.4	171.4	171.4	171.4	171.4
April 15	169.3	175.8	175.8	175.8	175.8
May 15	169.1	174.3	174.3	174.3	174.3
June 15	168.8	174.2	174.2	174.2	174.2

workers in manufacturing, as compared to the rest of the country. With few exceptions, employment in the Western half of the country has increased, while it has declined in the eastern half. In Massachusetts, for example, manufacturing employment in April 1947 was 749,900, but by April 1948 it had dropped to 729,200; in Connecticut the figure in 1947 was 419,900 but decreased to 406,400 by April 1948; New York went from 1,893,400 in April 1947 to 1,850,400 in April 1948. The only two states showing sizable gains were North and South Carolina.

In the Western states, on the other hand, manufacturing employment was steady or

MANUFACTURING EMPLOYMENT

Estimated Number of Employees in Non-Agricultural Establishments—Source: U. S. Bureau of Labor Statistics

	MONTANA	IDAHO	WYOMING	COLORADO	NEW MEXICO	ARIZONA	UTAH	NEVADA	TOTAL MTN.
	1947	1948	1947	1948	1947	1948	1947	1948	1947
January	16,300	17,700	16,300	17,700	16,300	17,700	16,300	17,700	16,300
February	16,400	17,300	16,400	17,300	16,400	17,300	16,400	17,300	16,400
March	16,300	17,300	16,300	17,300	16,300	17,300	16,300	17,300	16,300
April	16,600	17,100	16,600	17,100	16,600	17,100	16,600	17,100	16,600
May	17,100	17,000	17,100	17,000	17,100	17,000	17,100	17,000	17,100
June	17,100	17,000	17,100	17,000	17,100	17,000	17,100	17,000	17,100

	WASHINGTON	OREGON	CALIFORNIA	TOTAL PACIFIC
	1946	1947	1946	1947
December	166,000	174,600	122,900	127,000
January	162,300	172,900	121,500	122,700
February	166,100	173,000	124,700	125,300
March	169,200	173,700	123,000	121,100
April	170,400	175,300	126,800	126,800
May	174,900	152,350	117,100	130,300
June	174,900	152,350	117,100	130,300

INSURED UNEMPLOYMENT

(Under all programs: figures in thousands. From Social Security Board)

	Ariz.	Calif.	Idaho	Mont.	Nev.	N. Mex.	Utah	Wyo.	Total Mtn.	Calif.	Ore.	Wash.	Total Pacific
Dec. 31	4.7	4.2	3.9	2.9	1.8	3.2	4.3	6	25.6	176.4	19.9	36.3	232.6
Jan. 31	5.1	6.5	6.6	4.7	2.0	5.0	6.3	1.1	37.3	204.2	27.2	45.7	277.1
Feb. 7	6.3	8.8	8.0	7.1	2.5	5.8	7.9	2.0	48.4	195.2	23.1	47.7	266.0
March 6	7.1	10.3	8.1	7.9	2.5	6.0	7.5	2.0	51.4	228.9	24.0	47.1	300.0
April 3	6.6	7.8	6.2	6.4	2.2	5.4	5.9	1.5	42.0	233.3	20.5	37.6	291.4
May 1	5.5	6.2	3.7	4.0	1.9	3.5	4.3	.8	29.9	220.6	16.5	31.5	268.6

► Because of its able management, Pacific Intermountain Express Company has become one of the nation's major freight carriers—a dependable transportation link connecting San Francisco, Los Angeles and Salt Lake City with Denver, Kansas City, St. Louis and Chicago.



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THE WESTERN OUTLOOK...News...Statistics...

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trucks showing the biggest percentage of gain. Lime and refrigeration plaster was up 24.2 per cent, ore and concentrates 20.1 per cent; paper, paper board and prepared refrigeration 19.8 per cent; other metals than iron and steel 18.2 per cent; petroleum and its products 16.6 per cent. Freight traffic on the Columbia River is expected to reach a new high this year.

Department store sales index for the 12th Federal Reserve District had climbed up in May beyond the level of last December after a sag from January through March. Bank loans in June reached a high point for the year, as did demand deposits, but time deposits have contracted somewhat from the March peak. Wholesale sales are generally above last year, except for machinery, equipment and supplies except electric.

Steel

Loss of 15,000 tons of finished steel products from Fontana, as the result of the need for blast furnace repairs which will take a month or more, is probably of more immediate concern to industry on the Pacific Coast than the much-debated mill basing price system, although U. S. Steel, Bethlehem and Kaiser are on the new f.o.b. mill basis. Colorado Fuel & Iron Corporation, incidentally, had not determined at the time of going to press, what its pricing method would be. New steel prices reflect an advance of as much as 14 per cent on some items.

It is expected that the new defense program will take 4 to 5 per cent of Western steel tonnage. Most of the steel for the government's aircraft program goes into engines, which are built in the east, but the steel for jigs, frames and buildings will be supplied out here. It is understood that there have been substantial inquiries from atomic quarters, which obviously would mean the Hanford project in Washington and perhaps also to some extent Los Alamos, N. M. Meanwhile the scrap situation gets steadily worse.

Despite the fact that the U. S. Supreme Court decision in the cement case, which caused the steel industry to swing over to an f.o.b. mill basis, would tend to localize the sale of steel, there are many indications that the mills are not going to abandon good customers at distant points and will work out adjustments wherever possible. Under the present tight supply situation, a steel user is practically forced to stick to his old source of supply, despite the fact that he may have to pay a higher price than before, because he may have no quota at all with a geographically nearer mill.

The Pacific Coast, Mountain states and Hawaii used about one-fifth of all the metal cans

IRON AND STEEL				
Western Area of the United States				
From American Iron and Steel Institute (in net tons)				
	Pigiron Output	Percent of Capacity	Steel Output	Percent of Capacity
December	209,815	97.6	397,905	97.0
January	211,208	95.4	398,553	92.8
February	198,927	96.2	379,291	94.5
March	186,966	84.5	395,781	92.1
April	133,030	62.1	310,108	74.5

shipped in 1947, and approximately one-fourth of the food cans. Out of the nation's metal can shipments, expressed in tons of steel consumed in the manufacture, totaling 2,956,116 tons, the West used 652,344 tons. Of a total of 2,146,601 tons of food cans, the West used 568,137 tons.

BANK LOANS

Industrial, commercial and agricultural
(In millions of dollars)
From weekly reporting member banks of Fed. Res. System in 7 western cities: L.A., S.F., Portland, Seattle, Tacoma, Spokane, and Salt Lake.

(Average of Wednesday reports)	
1946	
January	1,976
February	1,999
March	2,000
April	1,992
May	1,983
June	2,033

BANK DEPOSITS

(In millions of dollars—adjusted)
Daily average month, all member banks in 12th Federal Res. Dist. Demand deposits excluding U. S. Gov't deposits, cash items in process of collection, and interbank deposits.

	Net Demand Deposits	Time Deposits
1946		
January	9,095	6,015
February	8,836	6,044
March	8,685	6,065
April	8,676	6,036
May	8,720	6,012
June	8,777	6,019

FREIGHT

Cars of revenue freight, railroad carriers in 11 Western states.

(Compiled from Assn. of Am. R.R. weekly reports)				
	Carloadings		Received from Eastern Connections	
	1947	1948	1947	1948
January	480,719	472,567	250,315	250,104
February	509,715	463,921	288,172	271,370
* March†	656,920	600,715	350,527	313,850
* May	522,144	688,311	279,392	356,101
* June	714,982	718,618	348,892	358,714

*5-week period. †Incl. 4 weeks of following month.

Canning and Packing

California's cling peach season is so late this season that canneries expect to be running both peaches and tomatoes at the same time. The

Alloy Steel

	Output	Carbon Ingots, Hot Topped*
December	3,717	9,134
January	3,445	8,588
February	4,888	4,850
March	7,286	5,447
April	4,806	4,255

*Included in total steel.

apricot pack is estimated at around 4,500,000 cases, packed under a confused situation where, for the first time in history, dried 'cots were not the major factor due to the fact that the United Kingdom were not anxious to buy the dried variety if they were likely to get them for free from Uncle Sam. Cannery buying of fresh fruit from the growers ranged all the way from suspected \$25 a ton deals up to \$70 or \$80 a ton.

Another "first" came in the pear deal, where for the first time in history the canners did not take second place to the fresh shipping market, which normally runs about 2,500 cars. This year, due to cannery bidding that run up as high as \$120 a ton, only about 1,000 cars went to the fresh market. A short crop in the Pacific Northwest added to the urge of California canners to buy.

On account of a light set of peaches, the fruit sized up well and was expected to average about 1/16 of an inch larger than last year. Net tonnage of No. 1 fruit as estimated by the Cling Peach Advisory Board at 489,901 tons, as against 475,335 net tons last year. California Canning Peach Ass'n, which set its price at \$65 a ton on No. 1 peaches, has fixed \$35 on No. 3 fruit (fruit with one perfect half). No. 2 fruit, less than 2 3/8 inches in diameter, is not taken.

June 1 carryover figures show that cling peach stocks on hand had been trimmed down to 1,247,354 cases, of which 791,163 cases remained unsold. National total of canned tomatoes on hand was 2,514,924 cases, of which 1,444,860 cases were held by California canners. California tomato juice stocks on July 1 stood at 1,988,573 cases, about one-third less than were on hand June 1. These tomato products reports, the last to be issued until Dec. 1, also show 1,464,671 cases of tomato catsup on hand.

Oregon and Washington area pea packs are reported to be nearly comparable to the 1947 pack. Estimates placed the canned pea pack at 6,000,000 cases in the Walla Walla, Wash., area as compared to 6,700,000 cases last year. Frozen peas are expected to show an increase of about 12 per cent over last year.

Northwest production of sea food is expected to be much lower than usual this year. Effects of the flood in the Columbia River have been damaging to crab, clam, and salmon, and some effects will probably continue to be felt for several years. Reports from salmon packers in Alaska is not encouraging with the June pack about 40 per cent below the same month last year. During July the only bright spot was albacore tuna where good catches were reported and prices had dropped from a high of \$650 to \$580 per ton.

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WHOLESALESALES

In thousands of dollars. Percentage changes are from corresponding month of preceding year. From Bureau of the Census.

MOUNTAIN

	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm prod.	Change	General Hardware	Change
Dec.	635	+3	5,368	+27	...	...	3,647	-7	1,513	-3
Jan.	476	0	2,712*	+46	406	+9	1,442	...	...	...
Feb.	676	-1	2,808	+28	...	...	1,568	...	...	...
March	631	-6	3,390	+34	395	+20	2,055	...	...	...
April	789	0	3,657	+29	...	...	...	...	2,511	+26
May	284	+1	3,412	+12	...	...	...	...	2,313	+8

PACIFIC

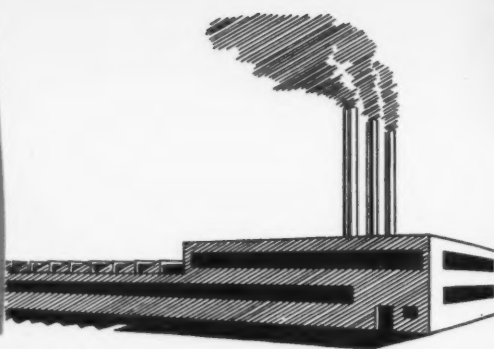
	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm prod.	Change	General Hardware	Change
Dec.	2,560	-13	21,380	-37	1,581	+5	13,302	-5	7,480	-2
Jan.	1,719	-18	10,858*	+31	1,634	+9	3,475	...	6,131	+6
Feb.	2,401	-19	11,542	+22	341	+20	3,289	...	7,277	-2
March	2,601	-16	13,550	+41	285	+42	2,889	...	8,626	+10
April	1,940	-15	12,546	+21	281	+55	5,215	...	7,414	+4
May	2,687	-4	12,587	+15	281	+6	6,984	...	8,096	+3

*Full-line wholesalers.

INDUSTRIAL SUPPLIES

	Change	Lumber & bldg. mat.	Change	Mch. equip. and supplies	Change	Metals	Change
Dec.	-12	1,444	+36	627	-32	670	+7
Jan.	-17	1,732	+30	521	-13	727	+5
Feb.	...	1,712	+48	774	-22	751	+17
March	+7	1,685	+28	857	-17
April	+4	1,906	+25
May	+6	1,616	+42	597	-17

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Electric Energy

Northern California's closest call on power supply came in July and August of this year, with the Pacific Northwest due for its narrow squeak in November, and southern California sitting in a favored spot with power to spare, sending 170,000 kilowatts to northern California in the peak period in addition to helping out Arizona every month through the year. On the July peak days the reserves in the northern part of the state were down to the 20,000-30,000 kilowatt range. Completion of another unit of Shasta Dam power and a transmission line to Shasta substation, plus PG&E's new hydro plant have helped surmount the danger. Arizona remains a tight spot, with pumping by farmers cut to one day a week, a situation which they foreknew when their crops were planted. Salt River Valley system is in the worst situation, because it has a 25-cycle power and so cannot be supplied with 60-cycle from southern California. The Tucson area has been supplied up to capacity from Parker Dam on the Colorado River. Montana is in good shape, and supplying power to the Spokane area. Although Utah is short of hydro power it has been helped out from the Geneva steel mill and Kennecott Copper Co. steam facilities.

A subcommittee of the Pacific Northwest power pool has been meeting during the past month to prepare plans for curtailment in energy use in event of emergency use. Details of the plan have been submitted to members of the pool, but not announced publicly. Members of the pool are particularly concerned about operations in event of a short water year when hydro-electric plants could not be operated at capacity and fuel oil would not be available for full operation of steam generating plants.

Non-ferrous Metals

Non-ferrous metal production held steady at a high level during July. Generally the industry was at capacity with available manpower. But wage and metal price increases during the month should tend to bring more men into the mines and stimulate production. Exploration work is on the uptrend and should be further encouraged by the lead and zinc price boosts.

As predicted last month, prices of zinc and lead rose during July to figures higher than the World War I prices which stood as record highs for 30 years. With the output of both metals down and demand continuing to be high there seems to be every indication that prices of zinc and lead will continue to rise. Cessation of the federal government's purchasing of zinc concentrates for stockpiling has led the Sullivan Mining Co. to limit purchases of zinc concentrates to the amount which the company's electrolytic plant at Kellogg, Idaho, can process. The company reported that its own stockpile had become excessively large while at the same time the aggregate monthly tonnage of concentrates shipped to the plant has been increasing steadily.

ELECTRIC ENERGY

(Production for Public Use—In thousands of kilowatt hours. Source: Federal Power Commission)

	Mountain	Pacific Northwest	California	Total Pacific
	1946	1947	1946	1947
December	1,002,170	1,191,939	1,413,478	1,606,168
January	1,061,564	1,228,508	1,477,873	1,635,440
February	962,756	1,168,514	1,328,994	1,539,841
March	1,041,287	1,200,824	1,454,305	1,628,060
April	1,185,575	1,402,860	1,456,204	1,722,614
May	1,254,204	1,432,407	1,450,716	1,661,764

NATURAL GAS

(CALIFORNIA)

(Compiled by Roy M. Bauer, gas supply supervisor, Southern California Gas Company)

	—Number of Consumers—	Domestic and Commercial	Industrial	Electric Generation	Net Receipts from Producers
1947 Avg.					
Apr.-June	2,264,203	5,615	12,978,115	10,812,647	2,609,401
July-Aug.-Sept.	2,286,105	5,416	9,011,093	13,555,587	4,472,142
Oct.-Nov.-Dec.	2,341,438	5,421	17,765,709	11,991,903	4,393,060
1946					
January	2,380,640	5,423	28,285,107	8,573,499	5,017,424
February	2,394,316	5,431	28,567,848	7,220,292	4,492,387
March	2,406,643	5,437	27,126,578	9,223,591	3,727,824

*Utilization figures do not include company use, storage, and unaccounted for.

The Bureau of Mines, reporting on pilot plant studies, has reported that commercially acceptable copper and cobalt concentrates can be produced by ordinary ore dressing methods from most of the copper-cobalt ores in the Blackbird mining district of Lemhi County, Idaho. Laboratory and small scale pilot plant studies were made between 1942 and 1945.

Aluminum

Aluminum production in the Pacific Northwest was scheduled to drop 6,000,000 pounds a month on August 15, because Permanente's sixth potline at the Mead reduction works at Spokane and Alcoa's fifth at Vancouver were to be cut off for lack of electric power. These two potlines were on interruptible contracts,

and received a two weeks extension of service from Bonneville Power Administration, in view of the fact that the late spring floods had resulted in a greater run-off than expected, thus slightly increasing the water supply. Output at Permanente's Trentwood rolling mill at Spokane was reduced accordingly, and Permanente expected to reduce its employment at the two Spokane plants by 400 men. All other Pacific Northwest operations are on firm power contracts and continuing full blast, with the demand situation far outrunning supply, due no doubt in considerable measure to the competitive situation in the industry which has resulted in many small sheet metal shops having been educated to the machining of aluminum. Orders

(Continued on page 31)

COPPER

(Short tons. From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST N STATES
	1946	1947	1946	1947	1946	1947
December	30,700	31,235	22,500	22,360	5,350	4,900
January	30,700	31,235	22,500	22,360	5,350	5,000
February	29,450	29,300	21,800	21,980	5,050	4,900
March	32,000	31,325	24,250	23,075	5,500	5,640
April	30,200	31,355	23,500	23,400	5,200	5,370
May	31,000	30,815	25,000	24,120	4,800	5,450

ZINC

(Short tons. From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST N STATES
	1946	1947	1946	1947	1946	1947
January	3,925	3,200	3,730	3,106	1,550	27,476
February	4,160	3,077	3,840	3,074	1,000	26,939
March	4,725	3,560	4,600	3,425	1,330	30,789
April	4,050	3,770	4,500	3,553	1,440	29,734
May	3,885	3,470	4,550	3,411	1,260	28,654

LEAD

(Short tons. From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST N STATES
	1946	1947	1946	1947	1946	1947
January	2,200	4,170	1,335	524	650	20,300
February	2,300	4,420	1,430	475	560	19,735
March	2,700	4,825	1,485	605	680	21,528
April	2,360	4,750	1,465	585	670	20,997

INDEX OF DEPARTMENT STORE SALES

Index numbers, 1935-39 daily average=100 with seasonal adjustment. Compiled by Federal Reserve Bank.

	Total 12th Fed. Res. Dist.	Southern California	Northern California	Portland	Western Washington	Eastern Washington and northern Idaho	Utah and southern Idaho	Phoenix
	1946	1947	1946	1947	1946	1947	1946	1947
December	321	352	343	388	287	318	1947	1948
January	314	340	338	373	275	291	301	352
February	311	319	341	365	267	282	308	301
March	319	331	359	374	281	283	300	318
April	320	353	350	400	282	303	292	335
May	329*	356	363*	404	292	313	315	339

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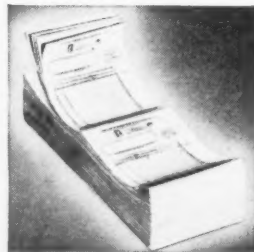
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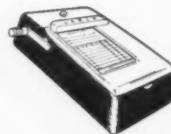
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from aircraft plants for the 70-group AAF program may mean as much as 10,000,000 pounds a month from the Pacific Northwest, and it is expected that aluminum for the Marshall plan operations will have to come from Canada.

Fuels

First major oil field to be discovered on the West Coast in a decade is what some geologists term the spectacular development now booming in Cuayama Valley of central California. Completion of a series of wells yielding high-gravity oil appears to confirm this opinion. The discovery is the fruit of a stepped-up oil prospecting campaign which in California currently has boosted drilling operations 40 per cent above last year's high rate.

Carrying their search to distant lands, the newly formed American Independent Oil Company has outbid competitors of two nations for rights to test the oil possibilities of the Kuwait-Saudi Arabia "neutral zone" in the heart of the Middle East's major oil region. First big operation in this area to be tackled by independents, it is backed by a group which includes officials of the Hancock, Honolulu, and Signal companies, as well as several eastern firms.

With the aid of U. S. interests, Mexico will expand her production. Pemex, the government monopoly, reportedly has agreed with the Texas Company on a five-year, 3 per cent loan of \$30,000,000, to be repaid in oil. Cities Service has arranged to participate in development of about 1,000,000 acres of land along the Gulf of Mexico, from the rich Tampico fields almost to the U. S. border, and stands ready to finance drilling up to about \$10,000,000.

Such operations have helped bring the world's average daily production of crude oil to new high levels, recently touching a mark about 13 per cent above last year's rate. Russia, Iran, Saudi Arabia and Kuwait have led in setting new records.

Summer's heavy gasoline requirements for vacation motoring and harvest of farm crops are having a still heavier impact on the oil supply this year. Taxable sales of motor fuel are running 8.5 per cent above the 1947 rate. With the shadow of threatened war darkening the outlook, the Senate Commerce oil subcommittee has recommended a series of moves calculated to make U. S. consumers begin to conserve fuel. The committee urged reactivation of the wartime state emergency fuel coordinators, asked a number of industry groups to review the transportation picture as it affects petroleum products, and hinted strongly that it would be unwise to levy any further price increases, so that "any federal action looking forward toward price controls or compulsory allocations may be avoided."

Steel pipe originally destined for the Trans-Arabian pipeline has been released to a Houston firm to expand movement of gas from the Mexican border in Texas to West Virginia. Some 255 miles of the 30 and 31-inch will be shipped as it emerges from the Consolidated Western Steel plant at Maywood, California. Arab-Jew strife evidently brought this windfall to U. S. gas consumers, Trans-Arabian having released the pipe because of the lengthy Commerce Department delays in granting export licenses to the Middle East.

Furniture

Although the semi-annual furniture market in Chicago in July appeared to be much slower than anticipated, most southern California manufacturers reported brisk selling. There were no

BITUMINOUS COAL AND LIGNITE

(In thousands of tons. From Bureau of Mines)

	(Colo.-N. Mexico)		(Wyoming)		(Utah)		(Montana)		(Wash.-Alaska)	
	1946	1947	1946	1947	1946	1947	1946	1947	1946	1947
December	...	885	...	827	...	715	...	330	...	164
January	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948
February	971	860	894	625	776	770	420	279	150	153
March	810	770	738	634	770	660	298	262	131	144
April	768	419	717	341	753	321	286	281	143	129
May	431	370	482	378	514	245	196	200	108	104
May	485	563	557	519	658	701	242	215	97	140

PETROLEUM

(California, Oregon, Washington, Arizona, Nevada)
(From Bureau of Mines)

TOTAL DELIVERIES

(Thousands of barrels daily)

	CRUDE PRODUCTION (Barrels, daily avg.)		GASOLINE		GAS OIL & DIESEL		HEAVY FUEL OIL		ALL PRODUCTS	
	1947	1948	1946	1947	1946	1947	1946	1947	1946	1947
December	927,197	948	308	349	146	173	416	441	993	1,091
January	930,953	1948	313	323	177	162	420	368	1,035	990
February	933,622	1948	320	313	142	204	425	394	1,012	1,053
March	29,138	1948	304	334	117	170	390	390	932	1,036
April	28,300	1948	336	357	125	159	385	357	988	1,000
May	29,335	1948	332	384	85	123	357	328	912	970

HOUSEHOLD FURNITURE

Manufacturers' Shipments—11 Western States
From Bureau of the Census
(In thousands of dollars)

	Upholstered Furniture	Other Household Furniture	Total
3rd quarter, 1947	\$11,047	\$15,929	\$26,976
4th quarter, 1947	13,336	21,098	34,434
1st quarter, 1948	10,633	20,739	31,372

price breaks, although some manufacturers came out with less expensive and therefore lower priced lines. Under a new contract between the largest southern California local of the Furniture Workers Union, AFL, and the majority of employers who bargain with this union, wages were increased 7½ per cent, an additional paid holiday was added, and provision was made for reopening the two-year contract at the end of one year with reference to wages only, any adjustment up or down being tied to the BLS cost of living index.

Manufacturers in the northern California area are working on a consolidated buying program for lumber, hardware, mirrors, cartons and other items which they believe will enable them to cut costs. It is understood that programs of this kind have been utilized in the Grand Rapids area.

Meat

Consumer resistance against high prices had begun to back up stocks of meat through July and a downturn in prices followed, which the

trade was unable to determine at the outset was a temporary phenomenon or not. Hotel and restaurant trade was holding up fairly well at that time. Some of the packing plants were having to run overtime part of the summer in order to handle large supplies coming in off the ranges. The hide market gradually has been firming up indicating more demand from the shoe trade.

Western meat producers also are suffering from a surplus of tallow and are hoping that the Office of International Trade will allow an increased export allocation sufficient to enable them to reach the Central American and South American markets via West Coast ships. In these areas the demand is strong. Tallow is the cheapest that it has been on the Pacific Coast for a long time, but soap sales are reported still holding up in this region, although reportedly 50 per cent off elsewhere in the country.

Apparel

Squeeze on less well-known manufacturers in the apparel field is intensified by the buying public's growing tendency to hang onto its nickels. Over-cautious buying earlier this year has resulted in many late orders for fall goods, retailers being reluctant to re-order until present stocks have been exhausted.

Makers of standard lines of men's wear still are producing at a high rate, but many smaller competitors are curtailing. Until more substantial orders from wholesale buyers begin arriving, they dare not over-extend their inventories. Retail sales in this field generally show no gains over last year, but in many areas are falling behind.

West Coast manufacturers are preparing for their seasonal showings, in mid-September, of cruise and resort wear. With new models exhibited simultaneously throughout the country, particularly in Palm Springs and Miami, they will be able to gauge the forthcoming season's business by the orders received. Knitting mills will present their entire year's line of swim suits. These showings will form the basis for nation-wide marketing of medium-price sports-wear, in which the West dominates the field.

Trade sources are cautious about predicting any improvement over last season's record, despite the generally quickening tempo of business.

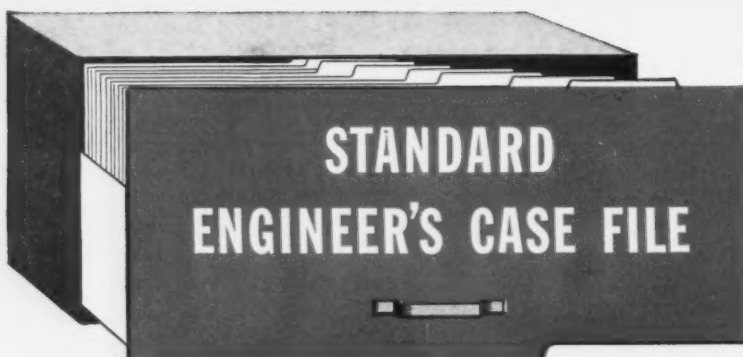
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APPAREL

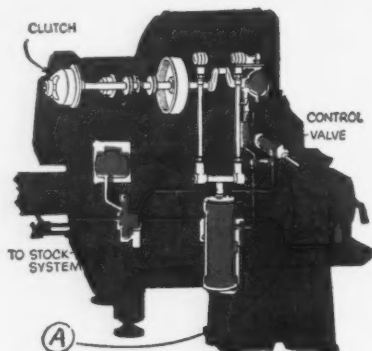
(In thousands of dollars)
Total Women's, Misses' & Juniors' Outerwear

	Los Angeles	San Francisco
April	7,118	1,721
May	4,505	1,731
June	4,188	1,383
July, August, September	23,245	6,699
Oct., Nov., Dec.	21,948	6,844
Jan., Feb., March	30,173	7,897

	Men's Overall (thousands of dozens) California	Men's Wool Work & Dress Trousers (thousands of units) California
October	29.2	128.3
November	24.7	100.1
December	22.0	103.3
January	34.4	90.7
February	26.8	85.3
March	33.0	109.6



CASE 1048A--STOPPING RUSTING, LAC- QUERING AND SLUDGE FORMATION IN HYDRAULIC FEED SYSTEMS.



HYDRAULIC SAW-FEED SYSTEM ON METAL-CUTTING SAW

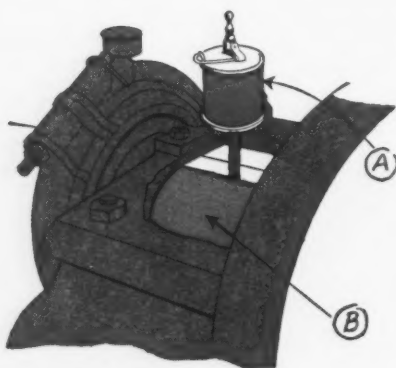
As the hydraulic medium in various machine tool control systems, doubly-inhibited Calol OC Turbine Oil lasted indefinitely . . . it was only necessary to replace oil actually lost from system. Comes in four grades: 9, 11, 15 and 19.

A. Contains highly effective corrosion inhibitor and oxidation inhibitor . . . has excellent metal-wetting ability . . . coating prevents moisture from contacting metal. Resists deterioration and formation of lacquer in hydraulic cylinder or sludge in lines, pumps, sump.

Easily reclaimed - water and solid contaminants separate readily from oil.

Calol OC Turbine Oil is widely used in steam turbines. Protects against rust in initial operation and later . . . turbine charges give service many times longer than straight-mineral oils without showing increase in acidity.

CASE 1063--REDUCING CONSUMPTION OF OIL USED FOR GENERAL IN- DUSTRIAL LUBRICATION.



STEAM ENGINE MAIN BEARING

In severe lubrication conditions, such as in the main bearing of a steam engine, consumption of compounded Calol Red Engine Oil X was 20 to 30 percent less than that of straight mineral oil. It is recommended for all types of bearings except high-speed, flood lubricated, anti-friction bearings where pickup may be excessive. Comes in three grades: 13X, 16X and 26X.

A. May be applied by all types of oiling systems - compounds promote better circulation in ring-, and chain-oilers.

B. Contains stringiness and oiliness additives. Forms tacky "oilskin" on bearings - resists heavy loads and high temperatures. Reduces friction, high starting torque and wear.

Calol Red Engine Oil X has excellent metal-wetting ability - protects metal against rusting even in high humidity conditions. Cools rapidly.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20, California.



FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

THE WESTERN OUTLOOK

(Continued from page 31)

Chemicals

Reopening of the Columbia Metals plant at Salem, Ore., for the production of ammonium sulphate fertilizer has been postponed past the Aug. 1 date set as a result of a continuing shortage of ammonia. A. W. Metzger, plant manager for Columbia Metals Co., has predicted that an ammonia plant may be constructed in either Wyoming or Oregon to provide permanent protection against recurrence of the ammonia shortage.

A four-year study of mint oils produced in Oregon and Washington has shown the Northwest product to be the equal of that produced anywhere in the United States, according to Dr. Louis Fischer, research pharmacist at the University of Washington, who conducted the study. Not quite a half of the total mint oil production occurs along the lower Columbia River, central Willamette Valley and in eastern Washington.

Sulphuric acid production in the West, now estimated at 200 tons a day, is likely to increase to 750 tons as a result of greater output by Garfield Chemical Co.

Supplies of drums and glass containers for shipping chemicals are in comparatively good shape. Drums require 30 to 60 days wait before orders are filled, and the decline in export trade has made one-gallon jugs and five-gallon bottles easily available.

Lumber

Lumber production in Oregon and Washington dropped materially during the second quarter of this year, although the total was still slightly ahead of last year, and predictions are that last year's record production will at least be equaled if not exceeded by a small margin. Major factors in the reduced production were an extremely late spring, a six weeks boommen's strike, and the flood on the Columbia River. The remaining factor which may affect production during the third quarter is a predicted shortage of railroad cars.

Stumpage prices are continuing to rise on the average in Oregon and Washington timber sales. The United States Forest Service reported that sales of forest timber in the last quarter of the fiscal year just closed rose to an average of \$14.18 per thousand board feet as compared to \$10.45 for the year as a whole and \$7.11 for the 1947 fiscal year. Oregon's continuing lead over Washington in lumbering was indicated by the fact that Oregon prices averaged \$11.11 for the year as compared to \$10.42 in Washington. About 50 per cent more timber was sold by the Forest Service in Oregon than was sold in Washington.

LUMBER

(In thousands of board feet)

From West Coast Lumbermen's Association (Douglas Fir, Sitka Spruce, Port Orford Cedar, West Coast Hemlock, Western Red Cedar):

Year through	1946	1947	1948
June Production	3,924,740	4,072,089	4,109,429

From Western Pine Association figures (Idaho White Pine, Ponderosa, Sugar Pine and associated species):

Year through May	1947	1948
Production	1,009,305	1,018,176

Pulp and Paper

The Ketchikan Pulp and Paper Co., a subsidiary of the Puger Sound Pulp and Paper Co., Bellingham, Wash., has qualified with the United States Forest Service for bidding on 8,000,000,000 board feet of timber near Ketchikan, Alaska. The qualification is considered to

(Continued on page 35)



Gas baking ovens are baked in gas ovens! Yes, it's true, and here are parts of bread ovens entering gas-fired "baker" at California Parkerizing Company, on conveyor-belt where they are first sprayed with enamel.

There's nothing like

GAS

for proper baking of enameled metal

The modern, gas-fired convection oven recognizes no rival for enamel-baking.

Results depend largely on heat-control—maintaining the exact temperature known to be best for each job, each type of metal.

Gas fuel provides both the flexibility and the required exactitude...with automatically-regulated oven temperatures from 150° to 350° F., easily and

quickly changed as needed.

Whatever your heat problem, gas fuel can solve it with better results at lower cost. Consult your gas company's industrial engineers.

The West Prefers

GAS

Better • Quicker • Cheaper

THE PACIFIC COAST GAS ASSOCIATION



The Governor of Kansas *invites You*



STATE OF KANSAS
OFFICE OF THE GOVERNOR
TOPEKA

FRANK CARLSON
GOVERNOR

To American Industry:

Kansas has matchless and abundant resources which await only the magic touch of industry to spread their benefits to the world. Its rich soil produces the essential foodstuffs of life. Beneath the surface is stored in abundance cheap energy to turn the wheels of industry. The possibilities of rich reward are limitless.

The facilities of the State, including the active and aggressive Industrial Development Commission, are pledged to offer every encouragement and assistance in working out the problems of new industries seeking to process and distribute the great natural resources of Kansas, which furnish fertile and almost virgin soil for aggressive modern development. A thorough investigation is always welcomed. Modern transportation permits products of Kansas industry to radiate cheaply to all parts of the country.

Sincerely,

Frank Carlson
Governor



Frank Carlson

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

THE WESTERN OUTLOOK

(Continued from page 33)

be the most definite move to date toward the establishment of a major pulp mill in Alaska.

An additional source of pulp and paper in the Northwest may come into production in about a year. The members of the board of directors of the Idaho-Montana Pulp and Paper Co. have announced plans to contract for the purchase of timber being cleared from the Hungry Horse dam site northwest of Kalispell, Mont. Past activities of the company have been largely concerned with securing capital for the mill which is planned for construction at Polson, Montana.

PULPWOOD

(Pacific Northwest)

(Cords of 128 cu. ft., roughwood basis.
Source: Bureau of Census)

	Receipts	Consumption
December	250,992	253,600
January	235,036	280,630
February	208,941	273,886
March	232,880	299,217
April	197,668	276,231
May	170,456	286,221

Plywood

Plans for the installation of additional plywood manufacturing capacity in the Northwest continue to be announced. Three plants to be in production during the first six months of next year were announced during July. These include a plant at North Bend, Ore., one at Grants Pass, Ore., and a third at Renton, Wash. Construction of the first two plants was scheduled to begin by late August.

SOFT PLYWOOD

From Bureau of the Census
(In thousands of square feet)

	1946	1947
December	121,816	149,999
January	140,058	159,395
February	129,622	156,285
March	139,670	185,716
April	147,008	164,862
May	142,409	150,717

Building Materials

American Appraisal Company's construction cost indexes reflect the following cost trend in Western cities, but not the relative trend between cities. They are based on average costs under normal conditions with no allowances for overtime, premiums on materials or special conditions.

	Decontrol November 1946	February 1948	March 1948	April 1948
Denver	326	430	433	433
Seattle	351	496	499	502
San Francisco	323	436	437	441
Los Angeles	344	459	459	464

1913=100

Sugar

Cane sugar refining was at its peak in July, and receipts from the Hawaiian Islands were running about even with the previous estimates. The Hawaiian quota was cut in July from 900,000 tons down to 825,000 tons, which is about all the yield that was expected. California and Hawaiian Sugar Refining Company had not reached a decision at the time of going to press as to whether to buy the Western Sugar Refinery at San Francisco, offered them by the Spreckels interests when the latter decided to concentrate entirely on beet sugar. Deliveries have been heavy on both cane and beet, as a result of inventories getting low and the canning season coming on. The entire sugar industry is beginning to wonder whether it will have to follow the lead of steel and abandon its present system of basing points in favor of f.o.b. mill prices.



Look beyond the price when you buy conveyers

■ In conveyers, like most other machinery, a purchaser gets substantially what he pays for. Experienced plant engineers have learned — many of them the hard way — that conveying equipment which is engineered to do **their** job, even though its first cost might seem to be somewhat higher — is by far the least expensive in the long run.

When **you** buy conveying equipment, consider the engineering and manufacturing experience, the materials, and the quality which have been built into it, and keep in mind that it is real economy to get sound engineering help with your materials-handling problems — help from people whose business is the development of efficient handling methods and the manufacture of fine conveying machinery.

The Mathews organization makes such service available to American and Canadian industries — service which is complete from preliminary planning to erection in the field, and which is backed up by the facilities of three very modern plants.



MATHEWS CONVEYER CO. WEST COAST
SAN CARLOS, CALIFORNIA

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA
MATHEWS CONVEYER COMPANY, LTD.
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities



A Thousand Improvements a Year!

We at Ryerson believe that constant improvement in every operation is the key to good steel-service. We continually invent, revamp, revise, reorganize—*improve*. Best of all, our employees help show us the way.

Last year, for instance, our employees submitted a total of 3,686 suggestions, each of which described a procedure, policy or piece of equipment designed to improve the efficiency of our steel service. Of the 3,686 ideas, 1,379 proved worthy of cash awards and are now being used to the ultimate benefit of Ryerson customers. Accepted suggestions ranged from a method of speeding the paper work in processing an order to more accurate gauges for our biggest friction saws.

This willingness of our entire organization to help achieve maximum efficiency is one reason we are able to promise you a steel-service that's

intelligent, ever alert to do the job still better. Encouraged to advance their own ideas, our employees often assist in determining practical alternates when great demand causes shortages of the steel you need. To put this kind of service to work for you, contact the nearest Ryerson plant next time you need steel. You can be sure we shall do our best to serve you.

PRINCIPAL PRODUCTS

BARS—Carbon and alloy, hot rolled and cold fin., reinforcing

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared and U.M., Inland 4-Way Floor Plate

SHEETS—Hot and cold rolled, many types and coatings

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STAINLESS—Allegheny sheets, plates, tubes, etc.

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Joseph T. Ryerson & Son, Inc. Los Angeles Plant: Box 3817, Terminal Annex. San Francisco Plant: Box 188, Emeryville. Other Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Philadelphia, Buffalo, New York, Boston.

RYERSON STEEL

PICTURE OF THE MONTH



THE INDUSTRIALIZED WEST . . . Expansion of industry in the West is closely linked to water resources for production of hydroelectric power. The white plume at right depicts the blast set off by Governor Sam Ford of Montana on the left abutment for the Hungry Horse Dam, which will be fourth highest in the world. Constructed by the U. S. Bureau of Reclamation at a cost of \$100,000,000, the dam will provide 300,000 kilowatts of power at the site and increase output of present and potential downstream plants by 800,000 kw., as well as aid in flood control and irrigation.

Conserving Water Supplies By Industrial Waste Disposal

By HERBERT C. DAVIS
President, California Association
of Production Industries

THE phenomenal growth of California has resulted in laying many problems in the lap of the state. One of the biggest is the matter of water pollution and industrial waste disposal.

It would not be correct to say that this is a critical problem as yet, for it is not. But it is acknowledged by all concerned to be a growing, pesty subject which, if permitted to go unchecked, would become a definite menace.

Nor should it be said that any health menace exists — particularly insofar as industrial wastes are considered, for state-

wide studies now being conducted have failed to reveal anything of a health problem. Rather, these studies indicate the need for returning our used waters to a supply of re-usable waters in order to obtain the most economical cycle of multiple benefits.

Industry recognizes these precepts and has taken rapid and definite steps toward the accomplishment of the end results. As a medium of clearing all information

through a central organization, the California Association of Production Industries was formed as a non-profit corporation. This organization, an "association of associations" — with individual members as well — was conceived for the purpose of co-ordinating industries' activities, of co-operating with public groups who are conducting state-wide studies and of educating the public as to the results of such a program dealing with the matter of waste disposal.

Membership of C.A.P.I. embraces the following industries: fruit and vegetable

canning, fish canning, oil, lumber, mining, wine processing, beet sugar refining, synthetic rubber manufacturing and railroad. Other industries in process of becoming affiliated with C.A.P.I. include the chemical and milk producing groups.

Progress of the work of C.A.P.I. has kept pace with the investigations of the Assembly Interim Committee on Water Pollution and Industrial Wastes and can be summarized as of the date of this issue of *Western Industry* as follows:

What was primarily an agricultural state not so long ago is today an industrial empire still in the course of development and with all the problems such a rapid growth presents. Linked to this industrial growth and its problems is the population of nearly 10,000,000 people now within the state's borders, for the sewage disposal accommodations are taxed almost beyond capacity.

Maximum Use and Re-Use

It must be kept in mind that, despite this rapid growth and development, the state's water supply remains the same. Therefore, to achieve the maximum use and re-use of our waters it is becoming more important each day that pollution be reduced to a minimum.

The Legislative Committee on Water Pollution and Industrial Wastes has not turned up any single case of industrial pollution that can be considered unduly menacing in itself. As the testimony piles up it becomes clear that the aggregate load is the cause of concern.

It has likewise become evident that those in authority find the existing laws to be inadequate, overlapping and outmoded. Water users are handicapped for the same reasons, with the additional complaint that there are too many agencies with too many rules with which to contend. This discourages the entry of new industries, because there is no certainty as to what demands will be made with respect to waste disposal and treatment.

All this leads to the first principle, which is that we need a clearing house where industry can find out what it is supposed to do, and, having complied with the regulations, have reasonable assurance that it can continue for a reasonable length of time without being harassed by a multiplicity of agencies.

No Health Problem Involved

Everyone recognizes that the state has the right to prevent the spread of disease. But there are many cases of industrial pollution, as distinguished from the discharge of municipal sewage, which present no direct menace to public health and whose offense, if any, falls in the class of nuisance.

Enforcement officials and the public do not always bear in mind that disposal of cannery wastes, for example, usually represents a political nuisance factor rather than a health factor.

Any complaints resulting from disposal of industrial wastes ordinarily involve odors, deposition of sludge banks, depletion of dissolved oxygen or change of PH of streams.

Some areas in the State may be willing to extend a certain amount of tolerance to industry in return for the employment and money that the industry brings into the area, and so it is a problem of balancing equities. This suggests a second principle, namely that pollution control should be regional and that any regulations should be sufficiently flexible to permit the region to decide how much nuisance it will tolerate, short of the point where public health is directly imperiled.

The Legislative Committee on Water Pollution and Industrial Wastes in presenting its report to the Legislature in 1949 will probably recommend laws to give over-all authority to one or more state agencies to be exercised only when local agencies fail to act. The committee has shown a definite interest in the seven watersheds of the state (see map) and

from its questioning of witnesses it is strongly indicated that the division of the state into the water districts thus shown will be given serious consideration.

Because of the many differences in industrial conditions in California it would be unwise for California to attempt to follow procedure adopted in eastern states. Practically all those states adopted stop-gap regulations rather than long-range planning with the result that only now, after years of experimentation, is a practical plan emerging.

Local Conditions Must Be Met

In California one over-all law, which may prove to be satisfactory to protect the underground waters in the dry south would perhaps be totally unsatisfactory in the coastal northern counties where the main supply is of surface waters. Likewise, a tailor-made law for the San Francisco Bay area would, in all probability be worthless to the Valley basin.

To set up local districts as already mentioned, with authority of enforcement placed in the hands of local people who understand the local problems might be a most desirable step toward the solution of the problem.

The success of any system of watershed authority will depend upon making a clear distinction between the responsibility and authority of the state on the one hand and the regional or watershed authorities on the other. If that is not the case, industry will continue to find itself confronted with a number of sets of conflicting regulations, with consequent confusion, uncertainty and hardships.

Another important principle is that there be adequate time to abate whatever nuisances exist. Here again, it is recognized that any direct menace to health and any waste disposal which tends directly to spread disease should be cured quickly, and that the state has power to require this. However, the majority of industrial wastes present no direct health hazard. The prob-



• SCIENTIFIC METHODS WILL CONSERVE MILLIONS OF WASTED GALLONS

lems which they represent have grown up slowly, sometimes through increase in scale of operations, and sometimes through a change in the character of the neighborhood where the plant is located. There are instances of plants which when they were built, were out in the country far removed from residential areas, but now find themselves surrounded by unsympathetic communities. Problems thus created over the years cannot be corrected overnight and the public should recognize this fact.

Definite Program Essential

There has been less time to set its house in order than in the case of municipalities. This is based purely upon the idea that industry can and does act more promptly than government, but to insist that it do so is discriminatory and bad.

It is generally agreed that sound regulation should be sufficiently flexible:

(a) To permit each region to determine the extent to which it will go in suppressing nuisances, as distinguished from direct menaces to public health, and

(b) To permit industry to determine how to obtain a given end result.

There are too many laws and regulations which specify not only *what* the end result must be, but *how* it shall be attained as well, and there is a tendency to engage in design of waste recovery plants that are to be built by private industry. Once an industry knows what standards it has to meet in terms of performance, it can be depended upon to select the means to accomplish that result and should have latitude to accomplish it as economically as possible. Government designs tend to be monumental and are, in general, built to endure for what may be an uneconomic period in the case of industry.

A recent example of the economies which can be achieved by permitting industry to determine *how* to do a job is the waste disposal collection system at Fish Harbor on Terminal Island. A government sponsored design would have cost about \$440,000, but when the fish canners were given the design job and only the end result was specified, they built the plant to do the job for less than \$100,000.

Principle number five is that self-policing and the voluntary establishment of a code of ethics by industry should be encouraged. There are a number of successful examples of this practice in California and these should be continued and multiplied.

One successful example is the case of the fish canneries in Monterey in the abatement of odor nuisance. As long ago as 1926 the Monterey fish canners assigned a full time engineer to educate management and to police operations. In consequence, complaints from residents of the Monterey Peninsula are rare and when received, result in prompt correction at the source.

In many cases, the easiest solution to an industrial waste problem is discharge to a public sewer. Most communities in Cali-



PROPOSED WATER RESOURCES REGIONS

1. North Coast.
2. San Francisco Bay. Subdivided into three watershed areas.
3. Central Coast.
4. South Coast. Subdivided into three watershed areas: San Diego; Santa Ana River basin; Los Angeles and San Gabriel Rivers basins.
5. Central Valley. Four parts: Upper Sacramento; Delta; Fresno-Madera; Tulare.
6. Lahontan basin.
7. Colorado River drainage.

OFFICERS OF CALIFORNIA ASS'N OF PRODUCTION INDUSTRIES

President: Herbert C. Davis, president of Terminal Island Sea Foods

Exec. Vice-President: Luther A. Nichols

Secretary-Treasurer: Albert F. Knorp

Technical Consultants: W. J. O'Connell and associates, San Francisco, widely known as experts on waste disposal

fornia are still anxious to expand their industrial development and are making attractive offers of sewer service with low or no "sewer rental" charges. However, some communities have reached what they believe to be their optimum industrial growth and others will. When that time arrives, an industry may find itself saddled with an exorbitant sewer rental and without redress.

So far as we have been able to determine, no ordinances covering sewer rentals include any mechanism for direct appeal from improper rates or from use of sewer rentals to accumulate revenue for the general funds. In anticipation of the day when the communities have stopped growing, when no groups are pushing for further industrial development, and can therefore be "soaked," it becomes of concern that there be a basis of appeal in every case where sewer rentals are charged.

This is, of course, only one aspect of a larger problem, that of assuring the right of appeal from the decisions of minor governmental bodies, whether they be city councils, state commissions or what not.

To summarize, the object of the California Association of Production Industries is sound regulation which will permit industry to develop in California. This object is not inconsistent with the aims of the other agencies involved, for in the long pull the interests of state, county, city, sanitation districts of agriculture, merchants, sportsmen and resort owners are dependent with industry on a healthy economy which makes the greatest and best use of the water resources of the state.

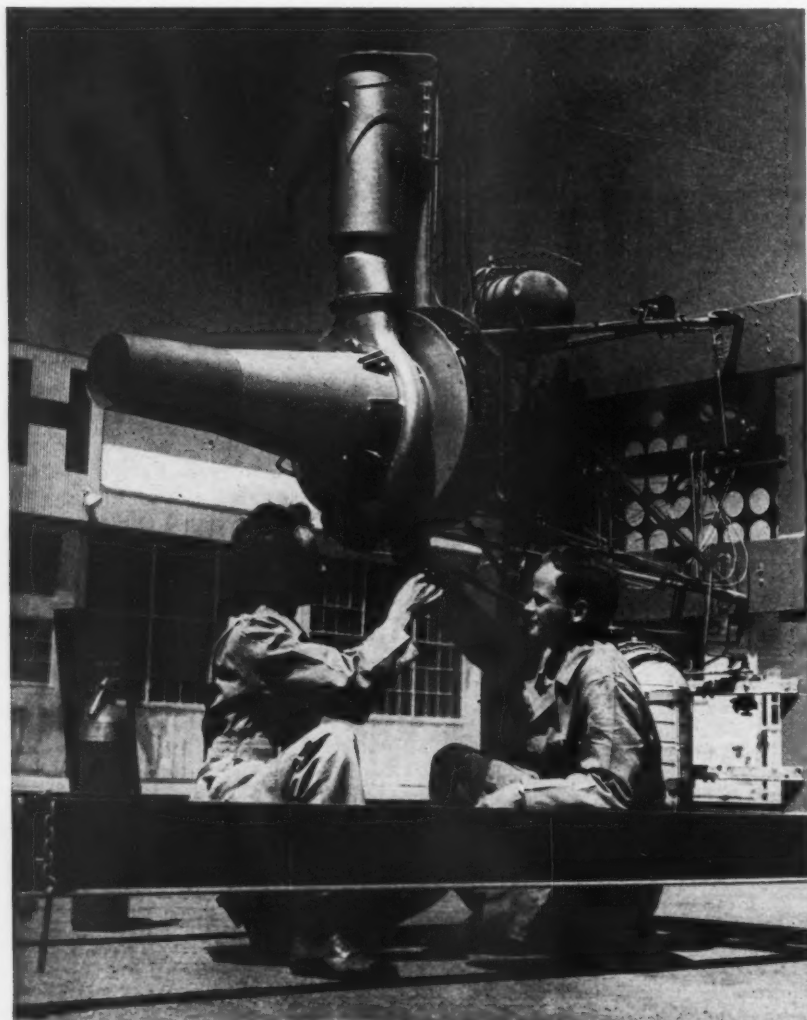
Industry does not shun its responsibilities and seeks to cooperate with all interests. Through C.A.P.I. it has sought out and presented the facts concerning the problems and has tried to give some guiding principles for the formulation of the necessary improvements. It believes that these principles are constructive and not in basic conflict with those of other interests, but is anxious to review them with anyone concerned.

Some of the more specific aspects of this general question as it affects individual industries will be discussed next month.

Jet Propulsion Model Built By Oakland Instructor To Train Mechanics

By CARL ROBERT OLDAKER
Engine Instructor,
Aero Industries Technical Institute
Member, American Rocket Society, and formerly
connected with Cal-Tech's rocket projects

• Carl Oldaker (left) and Harold Schedler (right) at work on their engine in the yard at Aero Industries Technical Institute. Jet nozzle is to be seen over Oldaker's head. Expanding air out of the nozzle creates the thrust which propels the aircraft forward.



WITH aircraft speeds pushing into and beyond the speed of sound, the tremendous power requirements has been met with an entirely new type of power plant; rocket and jet propulsion units.

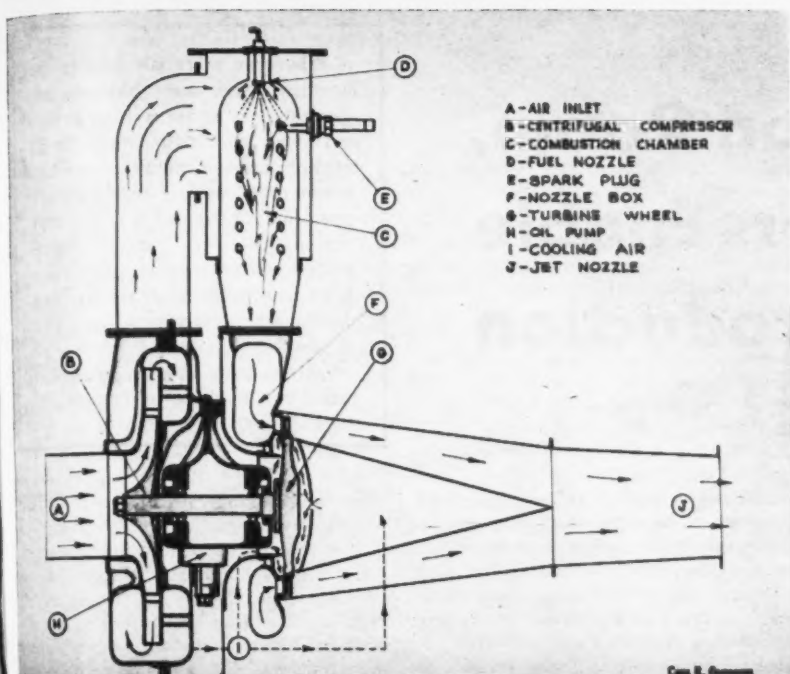
In keeping with the developments of the times, at Aero Industries Technical Institute, Oakland Municipal Airport, it was felt that the mechanics of the future should have a basic knowledge of the working principles of jet propulsion.

Immediately the problem of obtaining an operational unit was at hand. The challenge was met by the author and Harold Schedler, another engine instructor, with the construction of a "one-cylinder" jet engine. Built around the turbo-supercharger, used on many high-altitude aircraft, the unit presents a means whereby students may observe variations in temperature, pressure, and velocity throughout the jet unit.

Operating on the constant pressure cycle, air enters the inlet at (A) and is compressed by the centrifugal compressor (B). Leaving the compressor the air passes into the combustion chamber (C). At this point fuel, kerosene or gasoline, is injected into the air stream by the nozzle (D). The spark plug (E) ignites the mixture, and the expanding air enters the nozzle box (F), where it is directed onto the turbine wheel (G). The purpose of the turbine wheel being to run the centrifugal compressor.

After expanding through the turbine the air continues to expand and leaves the jet nozzle (J) at a much higher velocity than upon entry. The action of expanding the air out of the jet nozzle causes a reaction in the opposite direction which propels the aircraft forward and is known as thrust.

To achieve the success of this working jet unit, our conversion of a type B-1 turbo-supercharger included many changes



• Cutaway drawing shows operation of engine. The crying need in the 70-group Army Air Force program for engineers and mechanics trained in the new types of propulsion is pointed out in the southern California regional review on page 62 of this issue.

and additions. The device was mounted upon a portable test stand on which was installed fuel and oil tanks, instrument and control panels.

A combustion chamber consisting of an air duct of mild steel, with an inner chamber of stainless steel, was mounted between the compressor outlet and the turbine inlet. The installation of a fuel nozzle in the upper end of the inner chamber provided a supply of finely atomized fuel. To facilitate ignition of the fuel a spark gap was installed so as to extend into the inner combustion chamber.

A jet nozzle constructed of stainless steel was attached to the nozzle box with a removable extension to provide a means of varying the jet nozzle area. Inside the jet nozzle a conical fairing streamlines the flow of gases leaving the turbine wheel, also providing a means of circulating cooling air over the surface of the turbine wheel.

Alterations of the lubricating system included the installation of two spray nozzles directing oil upon the two main bearings. Provisions were made to measure bearing temperatures, oil pressure, and oil inlet and outlet temperatures.

Fuel Pump Eliminated

To eliminate the necessity of a fuel pump, a gas pressurized fuel system was employed. Two breathing oxygen tanks were used as the fuel containers in order that the gasoline or kerosene could be fed to the fuel nozzle under various pressures supplied by nitrogen gas. A needle valve,

installed between the fuel tanks and the fuel nozzle provided a means of regulating the power output.

Thrust measurements presented somewhat of a problem because of the use of a portable test stand. This was solved by supporting the test stand on four ball bearing roller supports, which allows movement of the stand with very little friction. Since the stand is free to move with any force developed by the jet, this force is applied to a hydraulic cylinder. Connected to the cylinder is a pressure gauge which is calibrated directly in pounds of thrust.

Operating Procedure Simple

The operating procedure for the jet engine is relatively simple, the first operation being to turn on the ignition system. The turbine wheel is then rotated slowly through the use of compressed air and a small amount of fuel is then injected into the combustion chamber through the fuel nozzle. As soon as combustion takes place the unit is accelerated by the compressed air until the turbine develops sufficient power to accelerate to the operating speed. The ignition and the starting air are shut off, the only remaining control being the needle valve, more commonly referred to as the "throttle."

To cease operation the unit is slowed down to an idling speed of 5,000 rpm., whereupon the needle valve is closed, and combustion ceases. The maximum speed attained to date is 22,500 rpm. The thrust could not be measured at that time because the thrust measuring device was not com-

pleted, but it is expected to be around 200 pounds. The average fuel consumption is approximately one-half gallon per minute.

Although most gas turbines burn more fuel than their competitor, the reciprocating engine, this is somewhat justified when considering the overall performance. With the trend in development towards larger type aircraft which require engines equally greater in power output, the reciprocating engine has become a complex and heavy power plant. The solution to this problem is the gas turbine with its simplicity of moving parts and greatly reduced installation weight.

The engine developed at "Aero Tech" is an example of a unit light in weight and containing only two main rotating assemblies, turbine wheel and compressor. Aside from its instructional duties the engine will be tested to determine the thrust characteristics, fuel consumptions, and combustion chamber designs.

Physical construction of turbo-jet engines may vary. While reciprocating engines are classified by the cylinder arrangement being either radial or in line, turbo-jets are classified according to the type of compressor, axial flow or centrifugal.

The axial compressor consists of a rotating drum with many propeller-like blades. As the drum rotates, the air flows parallel to the axis of rotation, hence the name "axial flow compressor." The centrifugal compressor consists of a rotating disc with vanes extending radially outwardly, which impose a centrifugal action that causes an airflow 90 degrees to the axis of rotation.

There is much controversy over the comparative advantages of the two types. Centrifugal designers boast of great flexibility, lighter weight and lower production costs. The axial flow unit is considerably longer and heavier and has the advantage of being smaller in diameter, thus allowing better streamlining with either fuselage or wing installation.

Turbo Props Also Important

Turbo-jets are not the only jet devices making the headlines today. The turbo-prop, the basic operation of which is similar, is also taking its place as an aircraft power plant. In the turbo-jet, the propulsive thrust is obtained directly from the high velocity exhaust. In the turbo-prop, the energy of the expanding gas is absorbed in a large turbine wheel, thus providing a source of shaft power.

Not all of the power developed by the turbine wheel is delivered to the propeller, as it is necessary to drive the compressor from the same source of energy. In the turbo-prop is found a power plant light in weight, free from vibration and readily adapted to streamline installations.

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No Expansion Room, But Conveyors Enable Increasing Production

Wherever materials are to be handled, there some business organization is either making or losing money, perhaps an amount large enough to mean the difference between profit or loss on the entire operations of the company. For that reason, "Western Industry" provides a continuous editorial service to its readers on materials handling developments and problems. The accompanying article is another of "Western Industry's" regular features on handling of materials.

HEMMED in by major highways and railroad rights of way that made expansion of the plant itself impossible, Sterling Electric Motors of Los Angeles were faced with an apparently hopeless situation when they wanted to step up their output beyond existing capacity.

But by substituting overhead chain conveyor systems, supplemented by hoists and gravity roller conveyors, for trucking and

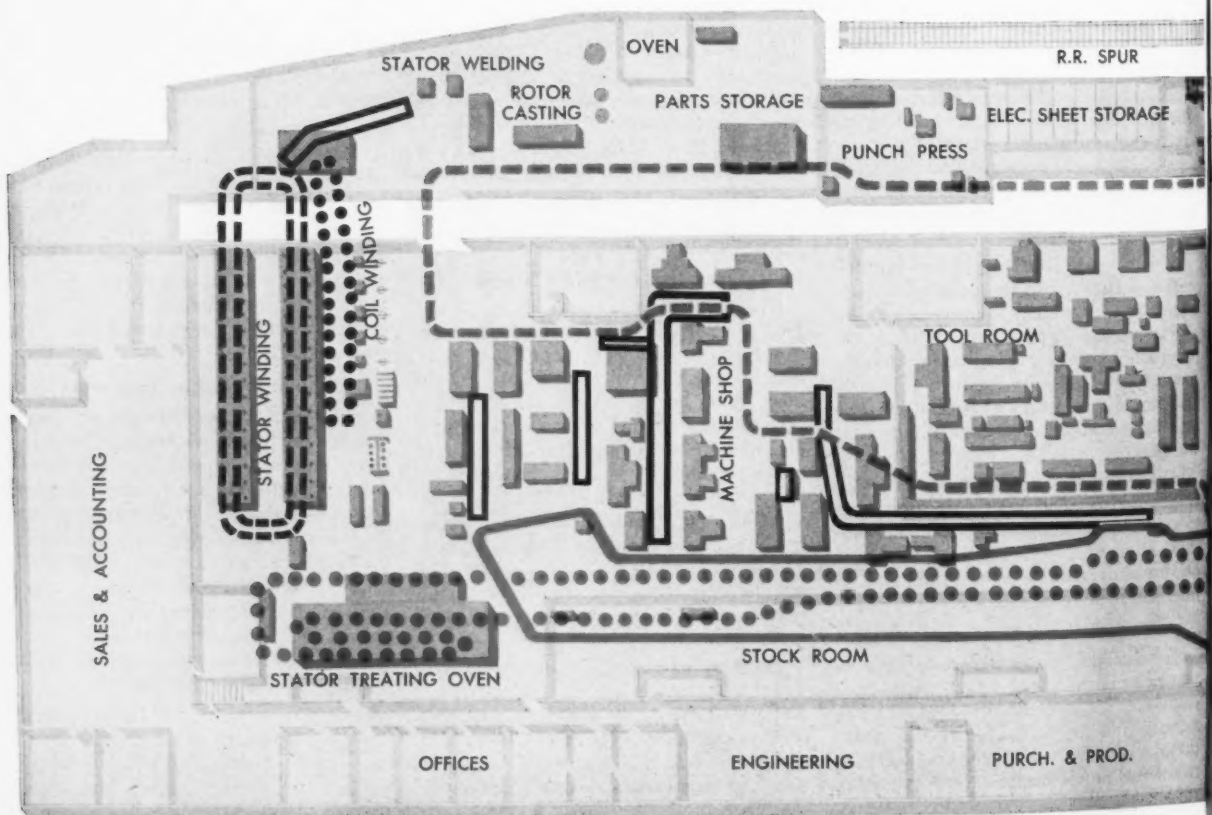
hand lifting of parts from one department or station to another, they were able to accomplish the needed increase in production handily.

Various manual operations were eliminated, painting time was cut down, production flow smoothed out and other advantages gained. Sterling now are able to carry a motor from the start of assembly to shipping platform in 1½ hours.

The system, which is an adaptation of

automobile assembly methods, was devised to facilitate production of a new line of motors recently introduced to the market, but it also is taking care of the concluding runs of the old models. By making use of each segment as it was installed, Works Manager Ernest Danielson, who designed the layout, was able to increase production each month during a construction period that lasted for about a year. His previous experience in directing production and

• Flow sheet of the Sterling conveyor system. Heavy dash line in red shows route of the main chain conveyor, used largely for carrying rough stock, red unbroken line the movement of parts from stock room, and red dotted line in lower left hand corner



assembly in automotive plants in the Middle West gave him the background for the job of planning.

Mechanical handling begins with the receipt of castings from the foundry in motor truck loads of 12 tote boxes weighing 10 tons in all. By using a fork lift truck, the castings are unloaded in approximately 10 minutes. After tagging with the correct count, the boxes are stacked by lift truck four high in the yard. This permits storing 100 to 150 tons of castings in a very small area.

When a work order is issued to the shop, castings are brought by lift truck to a point in the storage yard where they are loaded manually on the overhead chain conveyor, which for a large part of its length serves as a rough stock conveyor. Incoming coils of copper wire are also hooked to the conveyor for transfer to the copper storage area. The two pendants of the carrier each have a load capacity of 90 pounds, so units up to 180 pounds can be handled on each hook.

Rough Stock Conveyor

The primer coat of paint is applied in a tank in the storage yard by use of a dip section in the conveyor. This improvement over manual painting eliminates handling of each casting, does away with inside

spraying and gives an extra undercoat to the job. Drying takes place outdoors on the next 75 feet of conveyor, and for winter operations electric heating equipment will make up for absence of hot sun.

On reaching the disc grinder the castings are removed for face grinding and then put back on the conveyor, and at the next point the rotor and stator laminations begin to be fed into the system from sheet storage after being cut and notched. All the scrap from the punch presses falls on a traveling canvas belt which carries it to the sheet metal scrap bin, thus doing away with the familiar scrap bucket. The laminations fall one by one from the presses on a sort of spindle or holder, after which the spindle is hooked on the chain conveyor, eliminating handling of the individual laminations. From this department they travel to stator stacking and rotor casting, and after casting the rotors are again loaded on the conveyor for carriage to the machine shop for final processing.

Saving on Tool Set-ups

When the castings reach the cast iron machining department they are taken off the chain conveyor for turning, milling and drilling. Movement through these operations is by gravity conveyor to the

assembly department where the stator cartridges are assembled into the cast iron frames. Gear blanks take a similar route.

As the overhead conveyor travels through the tool room, the tool setups are hung on it to be taken to the machine shop and returned by the same method, which saves the labor of one or two men.

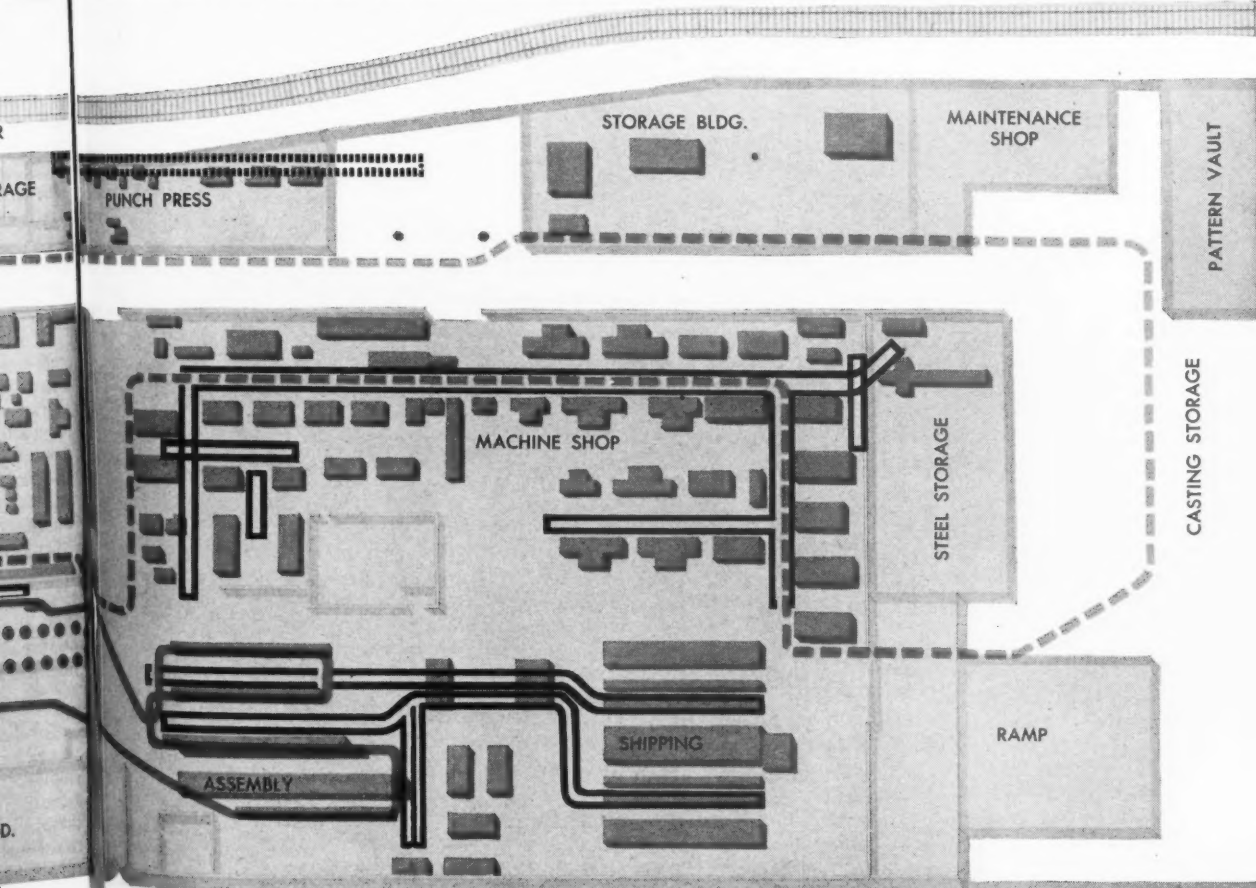
Economical Stock Storage

Motor shafts arrive at the unloading ramp in the form of bar stock delivered on semi-trailers which are backed under a bridge crane equipped with an electric hoist. With the aid of a grab hook or cable sling the stock is unloaded and piled between upright bars which are set loose in holes in the concrete floor. A steel link prevents the bars from spreading. This method permits storing a large amount of various sizes of bar stock in a small area.

The electric hoist and crane are again used to lift each bar and place it in an automatic cut-off saw. After the shafts are sawed to length and centered they are placed in metal baskets and loaded on a roller gravity conveyor which passes every machine operation until it meets the rotor core.

In the coil winding operation the chain conveyor eliminates the need for pans to

the conveyor for moving stators through the treating oven to assembly department. Black dash and dotted lines in upper left hand corner show the chain conveyors for stator and coil winding. The black unbroken lines indicate the gravity roller conveyors.



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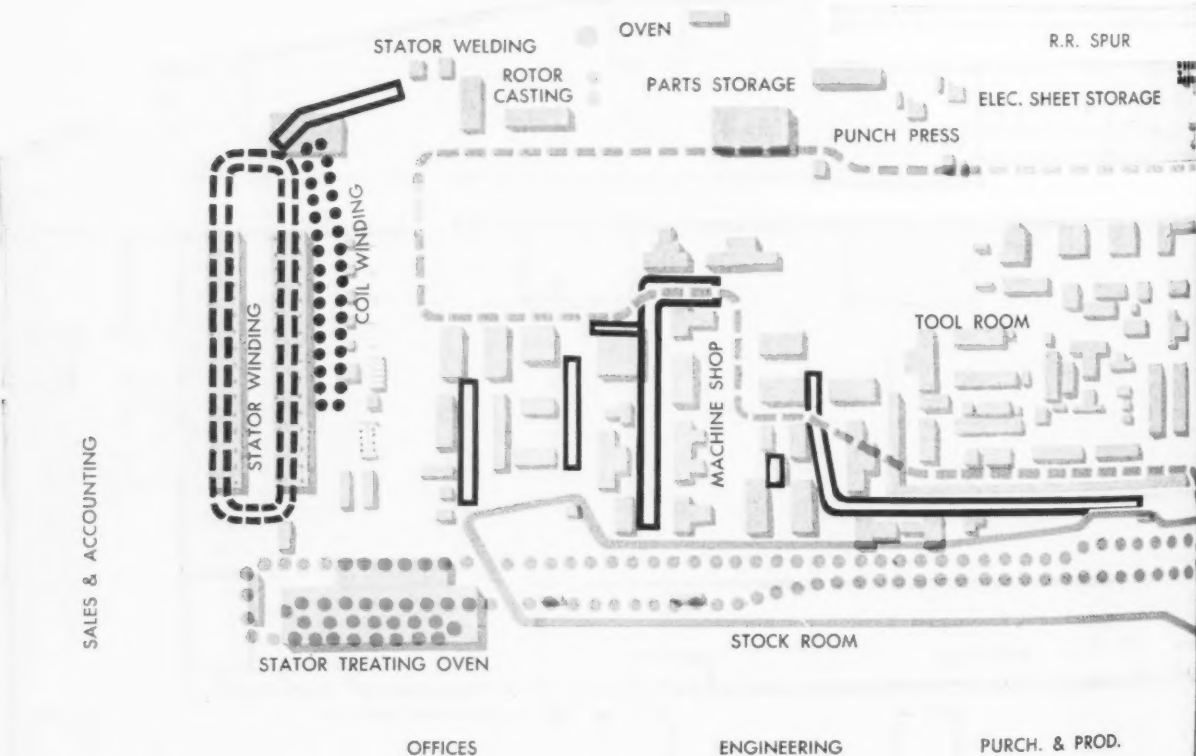
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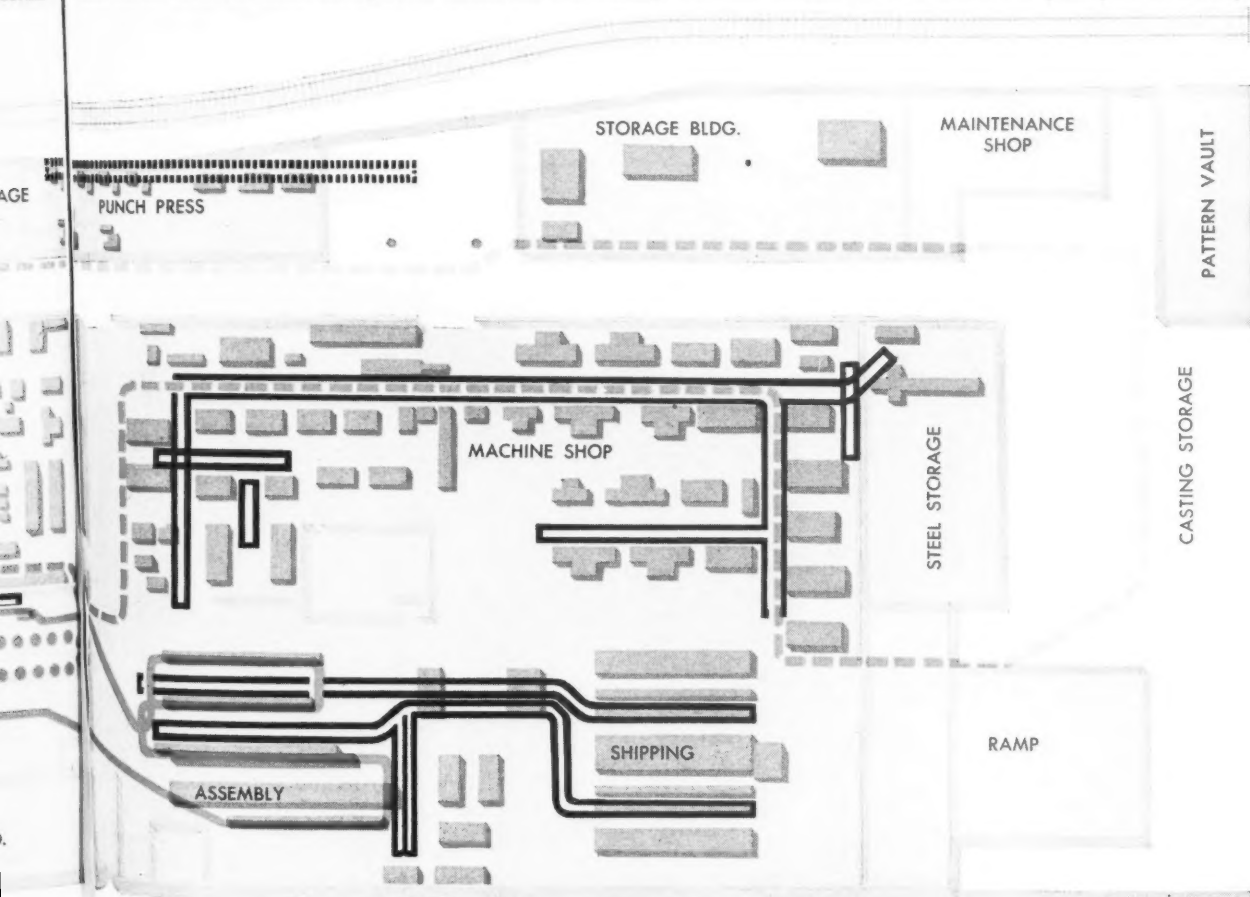
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the conveyor for moving stators through the treating oven to assembly department. Black dash and dotted lines in upper left hand corner show the chain conveyors for stator and coil winding. The black unbroken lines indicate the gravity roller conveyors.



carry work from one person to another. The spools are brought to each station from wire storage by conveyor and the finished coils from each station to the inspection point. Here time and effort is saved by having the inspector hook each coil on the chain conveyor to carry it to the loading station for the stator winding conveyor. The system supplies the operators with a steady flow of component parts and inspectors with finished wound stators for high voltage and other tests.

A variation appears in the stator winding department, where the chain conveyor is mounted in an inverted position in the center of a continuous steel table, using pusher dogs to drive small wood pallets or boxes. Each pallet or box carries all the materials necessary to wind a stator, and after winding, the stator goes back on the pallet to be taken to the next operation of connecting the leads. It is then replaced on the pallet for transit to the inspection

station, where the inspector loads it by power hoist on the stator treating conveyor for varnishing.

By using two dip sections and one straight section in the chain conveyor the varnish is automatically performed and it is unnecessary to have a man tending the operation. The straight section between the two dips allows the stator to remain in the varnish tank while the conveyor is in motion and become completely saturated with varnish. Then comes 90 feet of travel at 300 degrees through an automatically controlled constant temperature oven where the varnish is thoroughly baked. This continuous operation takes about half the time of the former batch system. An automatic dip is also being constructed for the red sealing application which follows treating.

At the station where the finished stator cartridge is pressed into the cast iron frame, the frame arrives from its processing operations on the rotor gravity conveyor.

The sub-assembly then is carried by conveyor into the assembling department. Here the finishing operations take place, roller gravity conveyor carrying the work from station to station. When the work is completed, all surplus parts go back into the stock room on the same conveyor that brings the parts out in the first place. Meanwhile the motors proceed further by roller conveyor for tests, final spray painting and delivery to the shipping department. Here an electric hoist running on a monorail track lifts the motors off the conveyor and deposits them on benches for crating, after which they are picked up by the hoist again and taken to stock shelves or outside to motor trucks for shipment.

Flexibility in speed of the chain conveyor systems is made possible by the use of Sterling's own variable speed motors. The overhead conveying systems were manufactured by Richards-Wilcox Manufacturing Company.

• A close-up view of stators and other parts hanging on chain conveyor, also the use of hoists and gravity roller conveyors.





Reducing Accident Costs Through Incentive System

By JOHN M. TRUE

Research Director
Mountain States Employers Council, Inc.

AN employee-incentive plan which has greatly reduced accident and damage costs for the Gallagher Transfer & Storage Company, Denver, appears to be one practical way to solve the problem of getting a fair day's work in return for a fair day's pay.

This is one of the most challenging, and often most difficult parts of an employer's job. Particularly in the service industries, business success is frequently measured directly by management's ability to promote cooperative effort on the part of its employees. The problem becomes acute as the steady round of wage increases pushes operating margins closer and closer to the limit.

In the trucking industry, damage charges resulting from careless driving are a recognized factor in operating expense that is too often taken for granted as one of the "natural burdens" of the industry. No one questions the fact that, in accepting employment, a truck driver assumes definite responsibility for safe driving and preventing accidents, but the real question is how to make each driver constantly aware of his responsibilities and, in so doing, promote the cooperation of all employees in cutting accident and damage costs.

Successfully operated for the past year, the Gallagher plan has all the virtues of sound principle and simplicity in application. In effect, the company, instead of paying outsiders for the cost of careless accidents, pays this money to its drivers in

reward for their efforts in reducing accidents. While it is not always possible to fix responsibility for every damage charge the Gallagher plan generally makes it possible to determine individual responsibility for damages, while at the same time promoting group cooperation to prevent such damages.

How Plan Operates

In setting up the plan, the company determined that during the past five years it had paid out one-half cent per mile for damages resulting from vehicular accidents. Accordingly, the company now credits an Accident Prevention Fund with one-half cent for each mile driven during the month. Since about 300,000 miles are turned in each month, the company's monthly credit to the Fund is about \$1,500. Approximately 40 over-the-road drivers, each averaging more than 7,000 miles per month, participate in the plan, and each driver shares in direct proportion to the number of miles he has turned in during the month.

Accumulated credits are computed monthly and are paid in the form of a bonus in addition to regular wages. For example, if there were no chargeable accidents during the month in which total mileage was 300,000, each driver would receive his share of the \$1,500 credited to

the fund by the company. Thus, if the driver had travelled 7,000 miles during the month, his no-accident bonus would be 7,000/300,000 times \$1,500, or \$35.00.

Fixing Responsibility

Every charge for damage that occurs during the month is carefully investigated to determine, where possible, who is responsible. The damage charge is first discussed between the driver in charge of the equipment and his supervisor. If no agreement is reached, the supervisor turns the charge over to the elected representative of the drivers. Henceforth, the question of determining responsibility for damages is entirely up to the drivers and their elected representative.

If the driver involved in the accident is still not convinced of his responsibility, the matter may be carried to a vote of all the drivers, in which case a majority decision is binding. Without doubt, this procedure allowing for the payment of bonus in direct relation to *individual* performance, as judged by the *group*, is the most significant factor contributing to the success of the Gallagher plan.

Key man in the effective operation of the plan is the driver's representative who, along with management, investigates all accidents and represents the interests of employees in determining responsibility for damage. After a few months' experience with the plan, it was found that the drivers' representative was spending con-

siderable extra time performing these duties in addition to his regular driving job.

After careful consideration, it was decided that it would be unwise for management to compensate a person whose task was to represent employee interests and who was, in fact, responsible to the employees. Accordingly, it was agreed that the drivers themselves should compensate their representative for his extra time. A sum of \$25 a month, contributed by all participating drivers, was found to be satisfactory. In this manner, the drivers were assured of having their interests ably represented, and the company was able to maintain an effective procedure for determining responsibility for damages to the satisfaction of all concerned.

Sharing the Cost of Damages

When it is decided that the individual driver is responsible for the damage, no charge is made against the Accident Prevention Fund accumulated by the company. Instead, the driver himself must pay for the damages resulting from his own carelessness. In no case, however, are the driver's basic hourly wages, as guaranteed by union contract, affected. Payment for these damages is made from what otherwise would have been the driver's share of the monthly accident bonus checks.

In the event that the damages exceed the amount of one such bonus, future bonus

payments to this driver are simply endorsed to the company, until such a time as the amount credited equals the amount of the damage. If, however, a major accident occurs, and the damage charges are more than an individual driver could pay from his bonus checks within a reasonable period of time, the major accident is charged against the Accident Prevention Fund. In this case, all the drivers suffer a reduction in their no-accident bonus by the amount charged for the major accident.

If it is agreed that no individual was directly responsible for the accident, the Accident Prevention Fund is charged with the full amount and all the drivers share in paying the costs through a proportionate decrease in their monthly bonus checks. Thus, if the company had credited the fund with \$1,500 and an accident occurred that resulted in damages amounting to \$1,000, only \$500 would remain for bonus distribution, providing the drivers were unable to fix the responsibility for the accident.

In the event of a major accident resulting in damages exceeding the total amount of credit to the fund, no bonus is paid out until the cost of damage is offset by future credit in the fund.

Termination of Employment

If a driver has been held responsible for damage and leaves the company before

paying off the full amount of his damages, the unpaid balance is charged against the Accident Prevention Fund and its payment is shared by all drivers.

It is not difficult, of course, to determine the actual cost of major repairs and damage to cargo. The damage items least susceptible to managerial control are those requiring minor repairs that do not warrant removing the vehicle from operation until its normal period for maintenance. In either case, damage charges are made on a monthly basis.

Determining Actual Cost

If the damage is too small to warrant immediate repair, the supervisor estimates the amount to be charged against the driver. When the vehicle is eventually placed in the shop for repairs, the driver's account is adjusted for any discrepancy between the estimated and the actual cost of the damages. The result is an understandable system of reward and punishment that is closely related to actual performance.

Controlling Trailer Damage

Since it is impossible to make permanent trailer assignments, a special system is designed to allocate responsibility for damage to these important items of equipment. A separate card is provided for each trailer, and affixed thereto in a waterproof container. Every defect and item of damage is listed on the card and each entry is initiated by a supervisor. These entries remain on the record until the defects are repaired or corrected.

When a driver is checked out with a trailer, the driver is required to make certain that all defects are properly recorded on the card before leaving the terminal. If unrecorded damage is discovered before leaving the terminal, the driver must report immediately to supervision and a proper entry on the card is made describing the additional damage. This entry clears the driver of responsibility.

Once the trailer has been checked out, however, the driver is responsible for all damages to the trailer until it is returned to the terminal at the completion of the trip. At this time, the trailer is inspected by supervision, and all unrecorded damage is noted on the card, and the responsible driver is charged accordingly.

Selecting Personnel

All applicants for driving jobs must, of course, demonstrate their ability in a road test. Although management makes the final selection, each prospective employee must also be approved by the drivers' representative before he is offered employment. Similarly, in the event a driver has a major accident, the drivers have the right to express their opinion as to whether or not the driver at fault should be continued as an employee. To date, management has invariably accepted the opinion of its drivers.

Both drivers and management are convinced that the plan is an unqualified success. Since the plan was installed, only two

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Chain Skid	<input type="checkbox"/> OK Pressure <input type="checkbox"/> OK Level <input type="checkbox"/> Generator Amps <input type="checkbox"/> Heat Moisture <input type="checkbox"/> Water Added <input type="checkbox"/> Time	
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major accidents occurred and the drivers have averaged about \$21.00 a month bonus in addition to their regular pay. More important, perhaps, the plan has contributed towards cementing a feeling of mutual confidence between management and employees. Besides realizing an increase in earnings, the drivers are convinced of the fairness of the plan, so much of which is subject to their own control. Although the plan is outside the scope of collective bargaining, the drivers' union representatives regard it highly and, indeed, could not do otherwise because of the popular approval of the rank and file.

The company has also realized a number of benefits in addition to savings resulting from the reduction of accidents. Labor turnover has been reduced and a high caliber of drivers has been assured. The necessity for carrying collision insurance on its own vehicles has been eliminated, and savings on property damage and cargo insurance have been affected, not to mention the clerical time saved in handling fewer accident claims. Finally, the success of the Accident Prevention Plan has contributed to the most significant, though intangible, asset of all — harmonious industrial relations.

Trucks and Barges For Hauling Chemicals

For short haul transportation, the question of moving chemicals in bulk by tank truck should be given immediate consideration, according to Donald G. Ward, traffic manager of Shell Chemical Corp., as it is the most practicable means of giving expedited service to customers. This is particularly true in the Western states, he says, where weight limitations permit loading from 6,000 to 8,200 gallons, thereby furnishing economical transportation costs without capital investments in tank cars and managerial responsibilities therefor.

The volume of individual chemical products to be shipped by a single manufacturer to a given destination is generally too small to justify bulk movement by tanker, Mr. Ward points out, but barges offer the next most economical transportation. Instead of shipping 130,000 to 140,000 barrels by tanker, it is possible to ship from 5,000 to 12,000 barrels by barge.

"Future development expected on the Pacific Coast is a barge of 25,000 barrels capacity," says Mr. Ward, "but barges cannot be expected to become much larger as towing costs become excessive. A towed barge, however, of 10,000 barrels capacity is far more economical to operate than a small tanker of say 30,000 to 56,000 barrels capacity. Barging has also become more flexible in that during the past year it has now been proven feasible and economical to operate ocean-going barges along the Pacific Coast from Los Angeles to Puget Sound."



REACTION TESTER FOR EQUIPMENT OPERATORS

Reaction time of materials handling equipment operators at the Oakland Army Base of the San Francisco Port of Embarkation is being tested with considerable success by means of a device invented and constructed at home by James Robinson, safety supervisor for the Port. While the machine is admittedly of Rube Goldberg design, it accurately reflects the reaction in feet and seconds of a vehicle driver suddenly confronted with the necessity of stopping his machine immediately.

Robinson, who lives in Redwood City, constructed the machine out of scrap materials for less than \$10. It has proved its efficiency by indicating slow reaction times for drivers who had passed tests under another system of measuring. Using 30 miles an hour as basic speed, a pointer reveals both the number of feet traveled by a machine while the driver reacts to an emergency stop, and the number of seconds needed for the signal to be acted upon. The driver being tested operates pedals similar to those he would use if driving a vehicle.

Following an award of \$25 and a certificate of appreciation to Robinson from the Port authorities, plans for the device have been forwarded to the Chief of Transportation in Washington for possible adoption at other Transportation Corps installations, and additional awards for Robinson.

Tool Engineers Meet in L. A.

More than 1,000 members are expected to attend the semi-annual convention of the American Society of Tool Engineers in Los Angeles, October 11-13, when a study will be made of the latest developments in tools and machines and how they are being utilized in the expanding Western industrial

field. Tours will be made of leading plants in the Los Angeles area, including the new Ford plant, Kaiser's Fontana steel mill, U. S. Steel Products Company, American Can Company, Firestone Tire & Rubber Co., U. S. Electrical Motors, Inc., Aluminum Company of America and Owens-Illinois Glass Company.

NEW PRODUCTION TECHNIQUES

Process Control is the Key to Low Pressure Laminating

By G. R. HUISMAN
Chief Plastics Engineer
North American Aviation, Inc., Inglewood, Calif.

BY PRACTICING not only raw material control but also careful process control which includes thorough inspection of finished articles, we have proved that low pressure laminates of a known character can be produced comparable with laboratory test results. It is the only practical method for maintaining quality and structural integrity in large parts such as radomes.

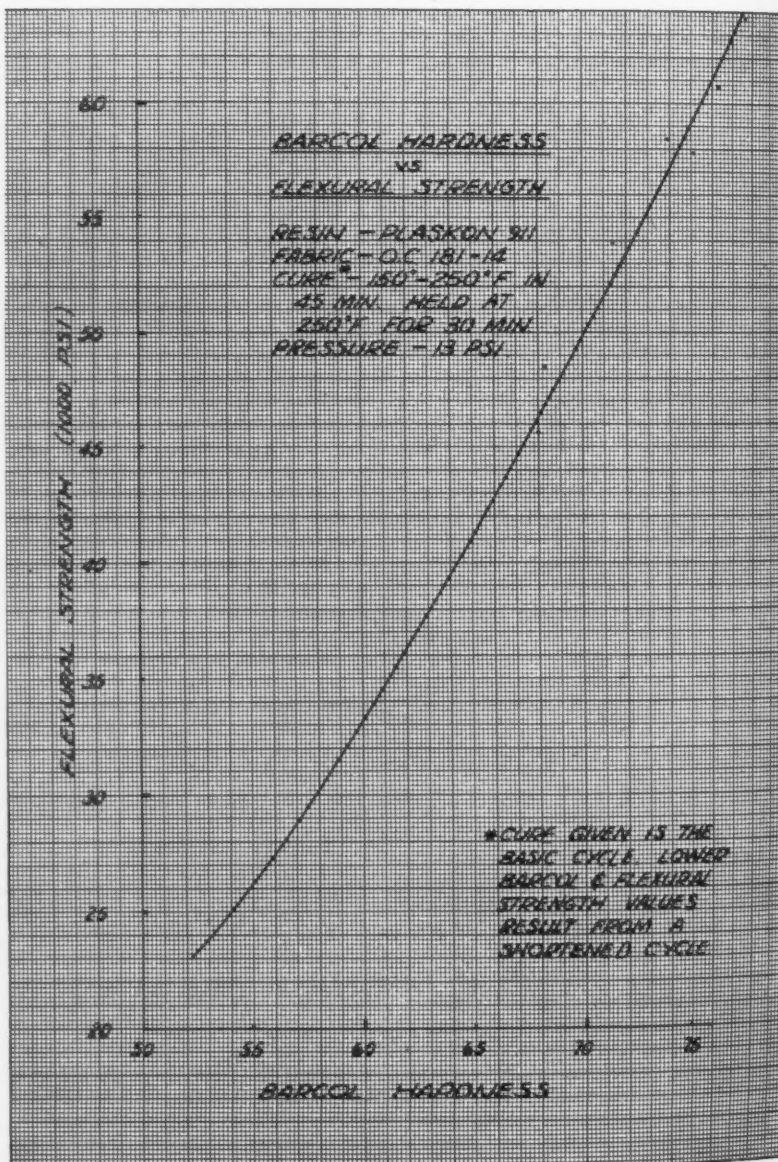
Without process control, basic differences in physical properties cannot be determined except by a laborious extraction of test specimens from each part or group of parts. Workmanship is the biggest controlling factor, both on the quality and economics of production, and constant vigilance of a group responsible for inspection and quality control is required.

Radomes are produced under short runs, utilizing pressure created by vacuum, laminating with glass fabrics for the filler and a high viscosity resin for the binder.

In aircraft, glass fabric has been used extensively as a filler. Experience has shown that the principal variable in glass fabric is its surface treatment, and that glass fabric should be at least 99.7 per cent glass. The so-called "chrome" treatment can adversely affect the processing of laminates by inhibiting cure of the resin.

Resin is affected by a greater number of variables. Our experience has shown that the most important characteristic of a resin is its uniformity from one drum to another, which permits establishment of a standard process.

The proper mixing of resin, especially the addition of catalyst, is of considerable economic importance, since a common error in weighing or calculating during this operation can cause the loss of all parts made from that batch of resin. In order to prevent this, North American Aviation has used the simple expedient of preparing a small laminate from each batch of resin and, checking the cure by means of Barcol Hardness, similar to Rockwell Hardness in





• Low pressure laminate molded with gelled resin overlay in N.A.'s plastics department.

steel, will indicate the degree of heat treatment or cure and visual inspection will indicate the quality of treatment.

Maintaining proper resin content in impregnated fabric is important, especially in the fabrication of honeycomb core sandwich structures. Insufficient resin in the face plies of a honeycomb structure prevent an adequate bond of the face to the core and excessive resin causes resin drainage or "puddling" of the resin on the low side of the structure. Similarly, in ordinary laminates, insufficient resin causes starved areas which have low physical properties and poor surface qualities. Excessive resin causes accumulation of unfilled resin which invariably crazes and chips off.

A wet resin content between 38 and 42 per cent in 181 fabric is found to be satisfactory. This factor can be determined by weighing a fair size sample, at least one square foot, and calculating the resin content from the known weight of fabric. A sample should be taken from each separately impregnated piece of fabric. The fabrication of pressurized ducts from 10-mil fabric requires a higher resin content, from 46-50 per cent, to eliminate porosity.

Use of 65 per cent resin content in the face ply against the mold will provide a reasonably continuous resinous film for exterior parts. This increase in resin is found necessary wherever other means of obtaining a smooth, continuous resinous surface cannot be employed.

The cure cycle of the several resins investigated at North American Aviation definitely affects the basic physical properties of laminates. Data show a marked difference in modulus of rupture between laminates given flash cures and those given long slow cures. The apparent optimum modulus of rupture of an Owens-Corning 181 reinforced laminate made with Plaskon 911 resin at 13 psi pressure is 64,000 psi. The modulus of rupture of a similar

laminate, except for cure, is only 43,000 psi.

In the former case, the laminates were heated at 1°F. per minute between 150 and 250°F. and the latter temperature was maintained for 30 minutes. The initial rate of heating up to approximately 150°F. is apparently unimportant for thin laminates, and the rate of heating between 150 and 250°F. can be increased to 2°F. per minute without an appreciable reduction in physical properties.

In the latter case, the laminates were placed in a heated platen press at 250°F. and cured for 10 minutes, which was within the manufacturer's recommendations. The reduction in strength amounts to over 30 per cent, which cannot be tolerated on some highly stressed, large aircraft structures.

Controlling Cure Cycles

Cure cycles can be controlled in several ways, and the particular method employed will be influenced by the type of equipment used. Gas fired hot air ovens are used at North American Aviation and large parts are generally molded in massive cast Kirksite molds. Due to the fact that the mold will heat slowly, because of its mass, the cure cycle can be readily controlled. The general practice is to install thermocouples in the first part molded in a particular die and to keep a record of the proper cure cycle. All subsequent parts made in that mold are cured at the same oven temperature and same time cycle.

Inspection of finished parts generally consists of a visual and dimensional inspection and a Barcol Hardness check. Visual inspection prevents acceptance of parts with such defects as excess resin deposits, starved areas, pitted surfaces, blisters or delaminations. Dimensional checks verify conformance with drawing requirements and Barcol Hardness verifies a satisfactory cure.



• Controlled process produces sandwich structure radome, requiring great strength.

Magnesium Anodes For Water Heaters

MAGNESIUM anodes are now being installed by Mission Appliance Corporation of Hawthorne, California, in their water heater, to increase the life expectancy of the galvanized tanks which they believe will make them last equally as long as copper or monel. The theory and use of magnesium anodes for this purpose is explained by A. R. Duim, chief engineer of the company, as follows:

"The problem of corrosion of zinc-coated steel water heater tanks is primarily due to galvanic corrosion, an electrochemical process. This process results from the presence of many small galvanic cells on the wetted inner surface of the tank. The cells are actually different materials both physically and electrochemically; this is the same as saying that the coating is not homogeneous. Some of the cells or sections of metal corrode more readily than others and are typed as active or anodic areas.

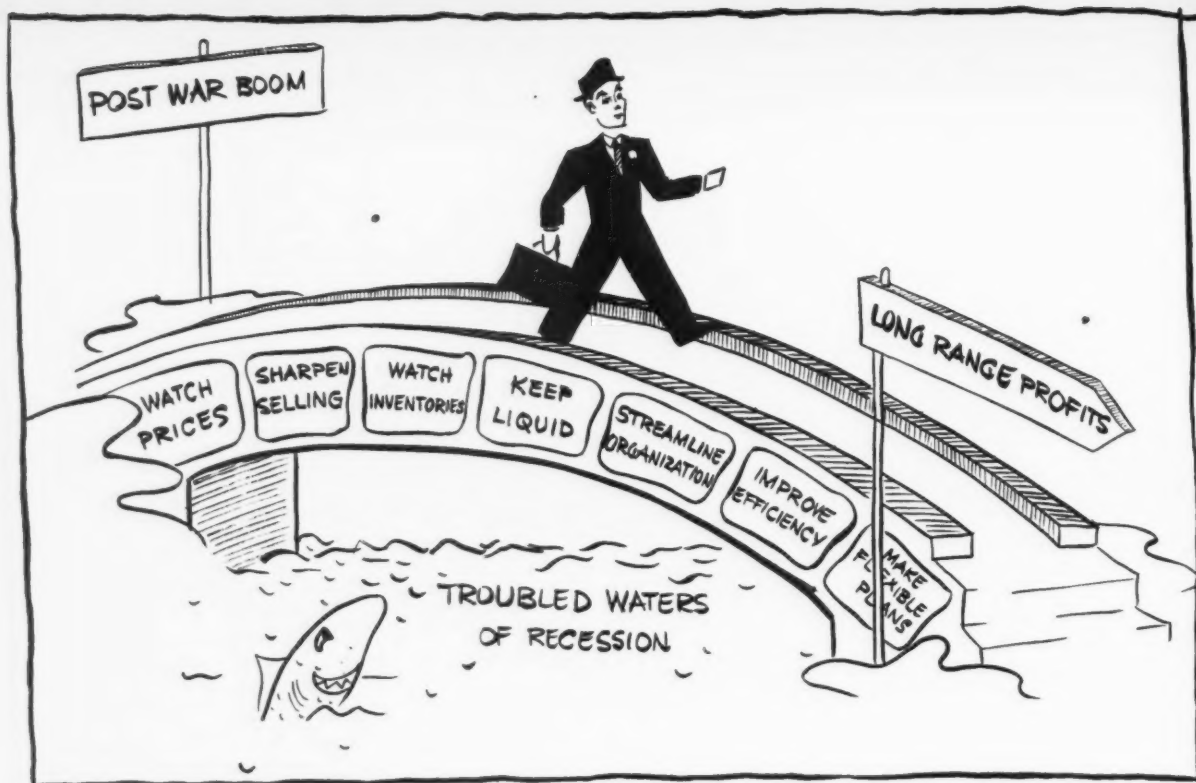
"Some are passive and are known as passive or cathodic areas. There is an electric potential difference between anodic and cathodic areas on the metal surface, the anodic areas being dissolved to satisfy the current demands of the cathodic areas. This action is commonly known as "pitting" and these anodic areas are the 'Achilles Heel' of the tank, for eventually corrosion when sufficiently advanced will produce a leak in the vessel.

"The functional idea of this corrosion protective device is by the insertion of another anode which is more sacrificial. Both anodic and cathodic areas are made cathodic. Thus there will be a metal, a special magnesium alloy which will be the only corrosive element in the tank. This anode will increase the normal life expectancy of the tank between seven and 10 years, depending on the aggressiveness of the water to corrode.

"This corrosion preventative now makes galvanized tanks most practical since galvanized steel is, except for its tendency to electrochemical reaction, the cheapest and most substantial method of protecting tanks. With this new rust immunizing agent, the tanks last as long as the more expensive corrosion resistant non-ferrous tanks such as copper and monel."

Extruding Stoker Fuel

A new method of producing stoker fuel is being used by Spokane Pres-to-log Co. of Spokane. Instead of a rotating wheel on which the larger briquets are formed, as in the standard Pres-to-log unit, the stoker briquet is made in a horizontal press that forces eight pressed fuel rods through a series of holes. As the pressed material emerges from the orifices, a rotating knife cuts the rods into pieces the size of nut coal.



Seven Ways To Stay Ahead Of Bad Business Weather

WORRYING about the uncertain future of your business will do no good unless it stirs you to some searching analysis and sound planning. Businessmen know that there is little so certain as uncertainty in the business outlook.

The present time is typical in this respect. Some companies can expect increased activity. Others may face the possibility of recession in the near future—a general economic recession or a selective recession in individual industries at different times. Successful management executives realize that companies who know how to meet changes are the ones who come out on top in the long run.

Have you checked your company's preparedness for a change in business weather? This discussion may stimulate your thinking and remind you of some well-tested principles which are often overlooked by busy management. And too, this seven-point program of preparation for a possible business recession will suggest

By A. E. WEROLIN, Partner
and
K. M. CUTHBERTSEN, Associate
McKinsey & Company, San Francisco
Management Consultants

sound practices which pay off in good times.

1. Keep Liquid:

How long could you stay financially liquid in the face of sales reductions of 10% - 20% - 25%? Liquidity requirements differ, of course, for individual companies. But in all cases temporary sales reductions may cause permanent business injury unless adequate funds are available to meet existing and unavoidable financial obligations. A recession might mean only a temporary set-back in sales. Immediate and severe retrenchment in operations and pay roll might prevent your taking advantage of the later recovery period. With adequate working capital, management can take time sensibly to analyze the reasons for sales decline, knowing that meanwhile

current liabilities can be met. The adequacy of working capital can be tested by developing forecasts of money requirements at various reduced levels of sales volume.

If you rely on receivables to provide much of the company's current funds, make certain that you do not become over-extended by selling to weak accounts. Visualize the effect of a recession on your customers and establish new standards of credit responsibility you feel they should meet.

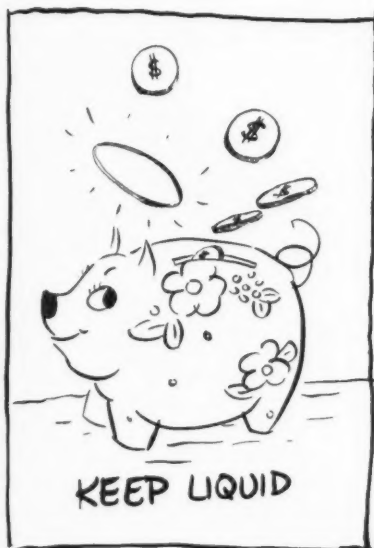
Check also your line of credit with your banker. Learn, as best you can, what, in the event of recession, the bank's plans are with respect to credit already extended to you and any additional credit you may need. Don't wait until you are in a jam to call on your banker. Plan with him ahead of trouble.

2. Watch Inventories:

Would a recession give you inventory jitters and thus dilute your effectiveness?

Are you speculating in inventory? If you know you are speculating, then at least measure the possible gains against the possible losses. Perhaps you are speculating in inventories without realizing it. To avoid this danger, review your inventory policies.

Effective management must have inventory data readily available and up to date. Knowing the major material and product breakdowns and the value represented by these groups is the first step toward inventory control.



With the facts available, management can then measure existing inventory levels against desirable standards. Do you know what these desirable standards are for your particular company? They can be set up by studying production and distribution policies to determine optimum inventory levels at various volume conditions.

Watching large inventories includes watching large purchase commitments. Large orders for future delivery could increase raw material inventories at the same time sales reductions are causing finished goods to pile up.

If you have established effective inventory controls and have planned their use under various possible conditions, you will have taken a big step toward preparing for business uncertainties.

3. Be Ready to Cut Prices or Jump to Lower Priced Lines:

Could you cut prices with confidence in the way you do it? Do you know how you can most effectively shift around within your product line? These considerations will be particularly important if our next recession turns out to be what some economists expect — primarily a price readjustment.

If you are among the leaders in price reductions and you cut prices sensibly, you may be able to hold or increase your share of the market. Obviously, you would thus enlarge your profit potential when costs

find a lower level. It is important, however, to avoid maintaining volume only at a loss. You can make sound price reductions only when you have the necessary information about product costs and your market.

As a result of product cost analyses, you can tell what your profit margins and "out-of-pocket" costs are for each major product. Such information will tell you where, and by how much, you can best afford to drop prices.

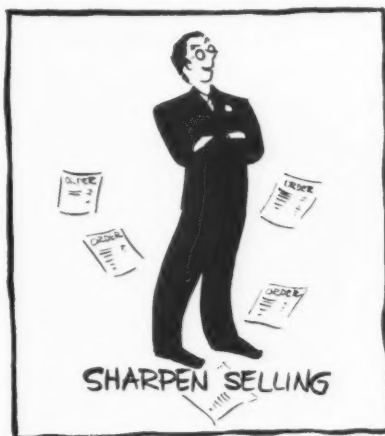
And use market research to supplement your cost analysis — to help you evaluate the relative competitive advantage of each of your products and to indicate the importance of price as a buying motive for your products. This information will tell you where in your product line you should cut prices the most and, just as important, where you should go easy on price reductions.

Cost analysis and market research will also point out possibilities for shifts within the product line — which products to emphasize and which to consider dropping entirely. If you already have a lower priced line whose quality is sufficient to have strong appeal in a recession market, be prepared to concentrate on that group of products. If you don't already have lower priced lines, consider opportunities to change product design and quality to reduce costs and establish an additional "bargain basement" line.

4. Sharpen Your Selling Effectiveness:

Does your sales organization know how to hustle after new business? Are your sales executives aggressive? A prolonged sellers' market has drained the red blood from too many salesmen. If you haven't already done so, you should consider ways to renew your organization's sales consciousness.

Has your sales manager polished up the important sales-management "tools"? Too many of the "tools" essential to success in a buyers' market have been forgotten dur-



ing the past few years. Make the most of tools like these and you will be prepared for any storm:

(a) *Estimates of Market Potentials.*

Know the factors which affect your industry's sales. Evaluate your competition. Use the study of potentials to help you set realistic sales quotas, to guide your promotional effort, to allocate sales effort so as to cover your best potential areas.

(b) *Customer Analysis.* Learn which customers have the best long-term outlook and, therefore, which deserve the most attention and help during a recession period. Know why existing customers buy from you and why potential customers don't. Direct your selling effort accordingly.

(c) *Sales Record Analysis.* Develop and use sales data to help you evaluate branch organizations and individual salesmen. Measure their gross sales in relation to potentials. Consider their new accounts, not merely by number, but by size and desirability. Study their expense records to see



how well they are using expenses to service existing accounts and to develop their territories.

(d) *Testing Procedures.* Plan how you will use pre-testing or sampling to check policies with respect to product changes, pricing, quality, promotion and credit.

Have you weighed the possible effect of reduced demand on your distribution policies? Can you estimate the breakeven point between costs of direct selling and costs of working through independent distributors? How valuable is the control you obtain through direct selling? What effect on goodwill might result from a shift to variable methods of distribution?

Do you know what changes might be needed in your promotional program? Other executives are already anticipating whether a recession will indicate changes in the basic promotion appeals or media currently being used.

5. Eliminate Looseness in Your Organization:

Have you cleaned out any and all inconsistencies which may have crept into your

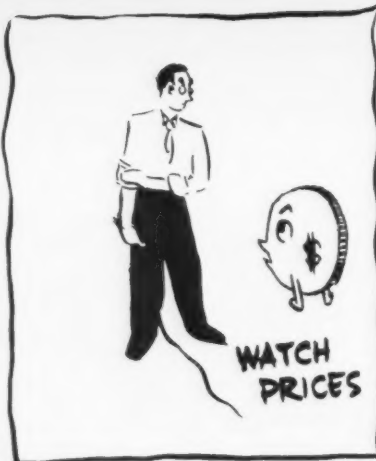
organization during recent years? In the event of a significant change in business activity you cannot afford to be weighed down by confusion, lack of decision, or duplication of effort. Dangers in lax organization are seldom obvious. You need to make an objective appraisal of company organization to be sure that effective teamwork exists.

In most companies it is of prime importance to decide on the extent to which control should be centralized. Too much centralization can become over-burdening. Investigate the possibilities of centralizing the formation of major policies and decentralizing the control over performance.

Here are some groups of specific questions to ask yourself in appraising your present organization structure:

(a) Have I too many subordinates reporting directly to me? Would a quick change in conditions result in ten or more different people frequently asking me what they should do next? Would any of my subordinates have a similar problem?

(b) Are the responsibilities and authority of each department head and each key



panies, regardless of size, have found that preparation of an organization guide "smokes-out" many inconsistencies, forms the basis for appropriate changes and helps personnel become familiar with the overall organization and their own responsibilities in it.

6. Improve Your Operating Efficiency:

Have recent profits tended to weaken your operating controls? Efficiency may lead to profits but, unfortunately, sustained profits too often lead back to inefficiency. You may feel a certain assurance because of an attractive operating profit margin, but you may be fooling yourself. A return to more competitive conditions will require that operating costs be pared to the bone.

Are you measuring your productivity and efficiency by adequate performance standards? Too often, during favorable periods of business, some executives measure performance solely in comparison with recent company experience, which may represent less than top-level efficiency. Objective and engineered studies of operating methods and procedures have been neglected to some extent during recent profitable years.

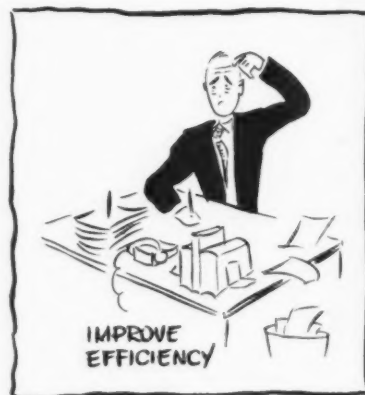
Establishment of performance "pars" need not be complex, but such a program should embrace the work of all major departments. The development of these measures will give you greater confidence in appraising operating results and in helping to locate important danger spots.

7. Develop Flexible Plans:

Do you have complete forward plans outlining the requirements of all units of your organization? Would a change in business conditions make your plans entirely useless? In a recession it is too late to adequately plan retrenchments. Operations quickly get out of coordination; executives face one unexpected problem after another; and confusion often results.

Only advance planning by all members of an organization will provide top management with an effective framework for action. Each department head should play

a dominant role in working out the individual requirements and the results expected of him in relation to overall company plans. If your executives and supervisors participate in forward planning, they will anticipate more quickly the effects of changing economic conditions on their own work. A soundly conceived expense and personnel budget is one ideal top-management tool to accent these plan-



ning requirements and to provide at the same time a standard for measuring actual results.

Worth-while planning efforts can be wasted, however, unless plans or budgets are flexible. Best results are obtained when plans can be quickly adjusted to changed conditions. You can assume, for instance, various possible levels of sales income based on differing volume, prices or product lines. Then under each broad group of circumstances you might have varying plans and budgets with respect to major policies in purchasing, manufacturing, personnel and finance. This type of planning will insure the kind of company-wide coordination needed to "roll with the punches."

* * *

Now — Act!

To capitalize on preparedness you must translate it into dynamic action. In a golf swing you don't stop when the club strikes the ball; you follow through briskly with the club to get the best results. Similarly in business you can take all the action steps already suggested, but if you don't follow through with aggressive and decisive action, your score won't be satisfactory.

Some executives proceed on a watch-and-wait basis when decisive action is called for. They fall behind the leaders and never again catch up. If you improve your organization and operations and develop flexible plans, you will then be able to size up a situation and act quickly and with confidence. The important thing is to take action when the time is right. In this way you can stay ahead of trouble.



individual clear-cut and thoroughly understood? Is authority commensurate with responsibility in each case?

(c) Is the flow of control clear? Does each individual report to only one superior? Does each individual know to whom he "reports" and who "reports" to him?

(d) Do line administrators, who direct action, recognize the place of functional departments, who develop and control the methods used in taking the action? Do the latter restrict themselves to functional control?

(e) Have special situations with respect to personalities or family relationships been handled within the framework of sound organization?

The smooth coordination of personnel in a business depends on each individual's understanding his function in relation to all others. When this understanding is not present, situations of overlapping responsibility develop constantly. Successful com-

Retirement Income Plan Helps Build Efficiency

THE retirement income plan, a key point in United Air Lines' general personnel policy, is now participated in by 80 per cent of all eligible employees, according to R. F. Ahrens, vice-president in charge of personnel.

Meeting with constantly increasing popularity, the plan has been extended to nearly 5,000 employees, roughly half the total personnel of the airline. Longevity and other considerations, according to Ahrens, currently limit the total of those eligible.

The plan, introduced in 1941, was a significant milestone in the company's long standing policy of increasing efficiency through improved internal relationships. Amounts of retirement income actually received varies with the length of service of the employee and with his salary. Both the participating employees and United contribute toward the fund.

So far 27 employees, including two pilots, have retired under provisions of the plan. Within the next five years 70 more employees will become eligible to retire.

Suggestion Conferences

Another strong factor which has worked for improved overall efficiency of the airline has been the suggestion conference. Nearly 100,000 man hours, and an estimated gross amount of \$192,446 were saved in the past three years through adoption of suggestions submitted by employees.

Men and women in all departments of the airline, from mechanical to clerical, are encouraged through a system of awards to submit suggestions. Awards average \$13 per suggestion, although the highest ever paid was \$2,500.

Life and health insurance policies in addition to medical departments are other examples of the airline's desire to make its various jobs something more than mere breadwinning. Social activity boards, which plan dances, picnics, etc., are in the same category.

In summing up the policy, Ahrens declared:

"A basic principle of this company must be one of sincerity and genuineness in all its relations with employees. It shall be the responsibility of management to reward meritorious service, ability and aptitude when handling promotions and wage considerations.

"A man's job is his livelihood—in many cases his only material asset—and its loss can cause severe hardship. Therefore it is something that must not be taken away without serious and deliberate considera-

tion of the human factors involved. It is a responsibility of management to assist employees in every way possible with their personal problems so as to eliminate or minimize worry that may effect an employee's standard of workmanship.

"Personal relations represent one of the most vital phases of business today. The responsibility for improvement in the physical, scientific and human relations of this activity rests with the personnel department. Constant association with leaders in this field and study is necessary to keep abreast of the developments."

This has been the creed as expressed many times by W. A. Patterson, president of United. For example, in a recent speech at San Francisco, he declared:

Employee Attitude

"Labor peace will come not through laws but from the hearts and minds of men—management as well as labor. We figured if we treated a man or woman employee at least as well as we treat machines, we would have almost perfect accord. People are not automatons and their problems are of the utmost importance."

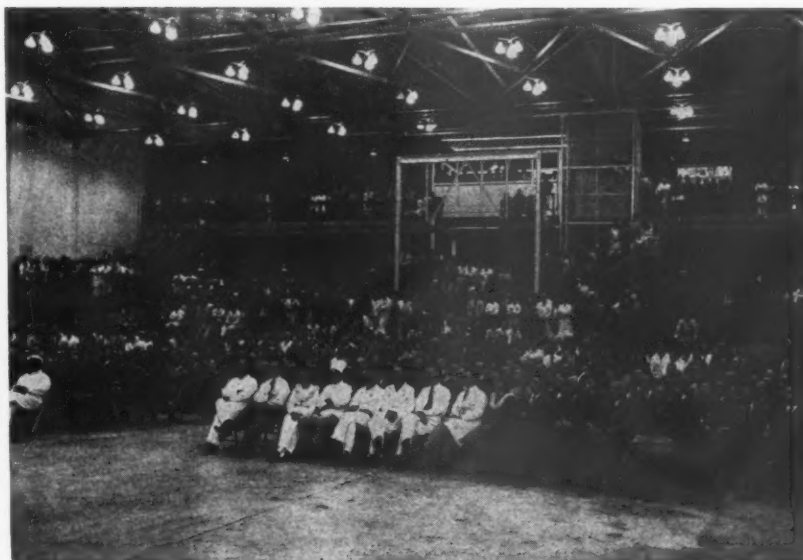
After a recent survey trip over the airline's 10,700-mile system, Mr. Patterson stated:

"I have been greatly impressed by and very appreciative of the attitude taken by all supervisors and other employees toward increasing our efficiency and reducing our costs. No small group of men in our executive offices at Chicago can accomplish results along this line. It takes the entire organization."

United, which was formed out of several predecessor companies in the early thirties, now serves 77 cities on its coast-to-coast, Pacific Coast, and Honolulu routes. Among its key stations are San Francisco, Los Angeles, Seattle, Denver, New York and Chicago. In San Francisco is located the vast new maintenance base which periodically overhauls the fleet of 143 aircraft; in Denver the operational headquarters; and in Chicago the executive headquarters.

According to Ahrens, a significant sidelight in the company's steady expansion is the regular appearance of more and more five, and 10-year lapel pins on its employees and the fact that 393 persons wear the 15-year service pin, and 99 the 20-year emblem. The growth would never have been possible, he believes, without this type of employee whose faith and interest in his company is attested to by his desire to remain with it.

• 1,400 employees at the San Francisco maintenance base listening to President Patterson in the main hangar. In the background is a service dock. The base has 300,000 sq. ft. of floor space, and engines are completely torn down and rebuilt after every 750 hours.



How The Newcomer Can Earn Profits In The Export Market Today

By ROBERT L. WALDECK

PASSAGE of the European Recovery Program has again focused, at least momentarily, the attention of many manufacturers on the sales they are making, or wish they were making, outside of the United States.

The newsletters tell us that immediately following passage of ERP, an avalanche of business men descended on Washington, bent on closing a few quick deals insuring their share of the billions of dollars to be invested in world recovery. And the newsletters go on to report that such trips were completely wasted; that American exports to be made under provisions of ERP must be based on the same fundamentals which have prevailed in the past: (1) the essential character of the product, and (2) development of demand for the product, not in Washington, but overseas in the various foreign countries themselves.

ERP billions will, for the most part, go through normal channels of foreign trade and, sad to say, far too many manufacturers either ignore normal foreign trade channels or regard them with suspicion.

Potential Is Ignored

It is a fact that, despite all of the learned pronouncements of the past few years as to the tremendous importance of export trade to our country's economy, the vast majority of U. S. manufacturers are ignoring the export potential of their products. Export sales are limited to a few foreign buyers who somehow learn of the products these manufacturers make and then succeed, without encouragement, in opening an irrevocable letter of credit. The commonly expressed attitude of many U. S. manufacturers is that it is just plain silly to go through all the headaches of export packing, foreign documentation, and dubious credit risks involved in overseas shipments when there is a greater potential "in the backwoods of Kentucky" than in all foreign markets put together.

Whether such snap judgments are literally true is certainly open to doubt. But there can be no doubt that for all manufacturers, domestic operations always have been, and always will be, of greater importance than anything that will be done abroad. Indeed, the very existence of the operation depends on maintaining competitive position in the U. S. market.

So if all of the ablest men, and practically all of the resources of the organization, are believed necessary to properly service the U. S. market this can scarcely be a matter of criticism. But at the same time it behooves all manufacturers to evaluate their product in terms of its export potential, and if that potential is promising, then some steps should be taken to fully develop foreign markets.

Manufacturers of worthwhile items, particularly of an industrial character, should reasonably expect part of their volume to come from Venezuela, South Africa, Brazil and Argentina just as readily as they take for granted sales in Kentucky, Washington, and New York. Obviously it is going to take effort, and of a specialized character, to get volume out of these foreign markets, but the cost should be no greater than to get comparable business in the states, and quite possibly, because competitive conditions are generally not so severe, such export sales will be among the most profitable made.

It is obvious that the method of developing a sound export program will depend primarily on the product to be marketed.



• Mr. Waldeck is owner-manager of Export Sales Management, Ltd., a firm serving as the export department of several Los Angeles manufacturers, including Turco Products, Inc. and Thermador Electrical Mfg. Co.

It is possible, however, to set forth a few tested and accepted principles governing such a program.

The Product

As a general rule, and assuming a fundamental need, the greater the complexity of the product, the more difficult the casting or the machining required, the more expensive the production set-up required to turn out the first unit, the greater should be the long-range demand in export markets. The great bulk of this country's exports are industrial items — items which themselves contribute to the productive capacity of foreign countries. Foreign countries need those items most, and since their total purchases are limited by a perpetually inadequate supply of dollars, it must be expected that those dollars will be first allocated to the most genuinely useful items.

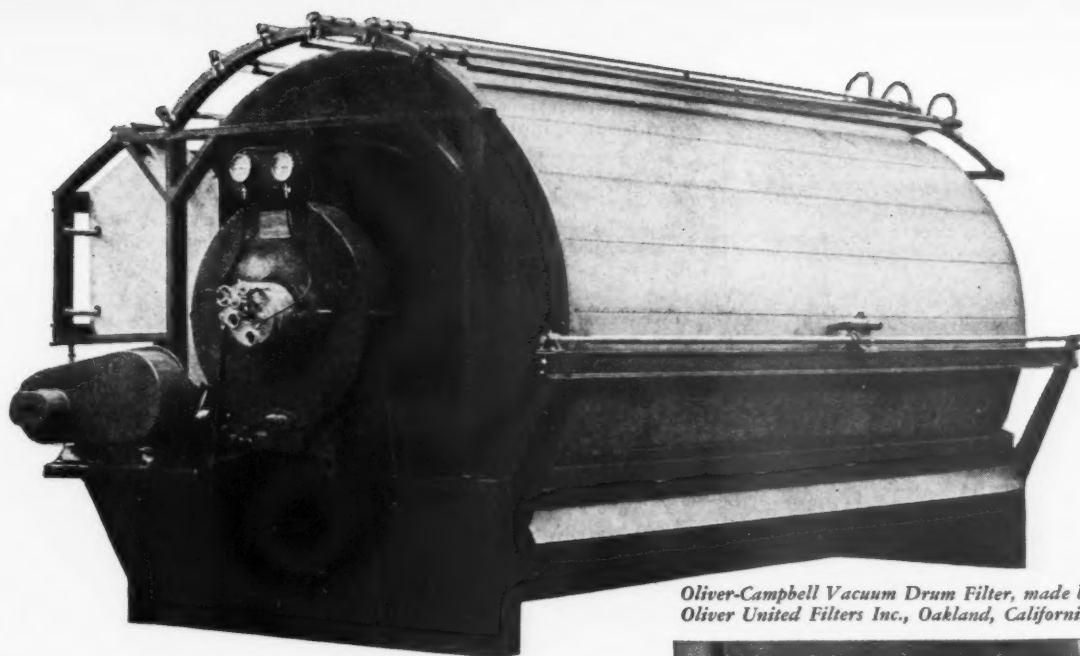
A second safe generalization concerning the product is that it be offered as a complete unit to do an entire operation. A manufacturer's sales effort is definitely handicapped if the item offered requires a complete and elaborate tie-up with a secondary unit. Either the secondary unit itself, or the technical ability necessary to effect the tie-up may not be available in the foreign market. Most foreign buyers much prefer to buy a production unit complete, with a single manufacturer standing behind the specifications.

Establishing Representation

Obviously, the nature of the product will determine the type of foreign representation you need, but this much is a virtual certainty: success in an export program depends almost entirely on the calibre of the foreign, on-the-spot, representation.

When traveling in foreign countries it is interesting and revealing to note inferior products far outselling products of higher quality in a particular market simply because the one manufacturer has the services of a better representative. To build a worthwhile distribution abroad it is necessary to locate the best possible sales representation in each market, and then activate that representation in the best ways that can be devised. Because the writer believes

(Continued on page 56)

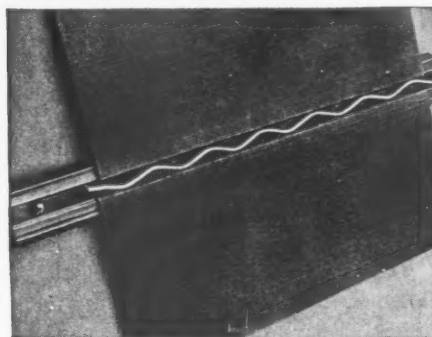


Oliver-Campbell Vacuum Drum Filter, made by Oliver United Filters Inc., Oakland, California.

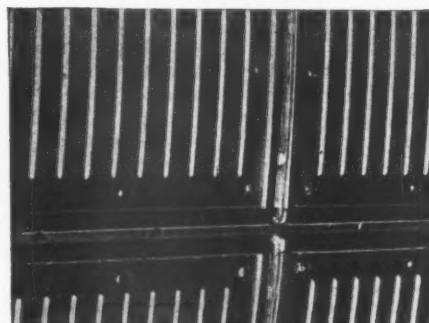
6 types of REVERE METALS in this vacuum drum filter

In the manufacture of this Oliver-Campbell Sugar Cane Mud Filter the following Revere Metals are used: Copper sheet, copper tube, brass sheet, brass discs, brass pipe, and brass extruded shapes. These metals are chosen for three chief reasons: they resist the corrosive action of the filtrate and cake, their mechanical strength is such as to assure durability, and they are quickly and economically fabricated. Use of extruded shapes is particularly interesting from a fabrication standpoint, the rather complicated forms required for the division strip being supplied by Revere in straight lengths that require only cutting and drilling before installation. Similarly, the zig-zag caulking strip that holds the screens is a Revere rectangular extrusion that needs only cutting plus formation of the zigs and zags. The screens, incidentally, are copper sheet, perforated 625 holes to the square inch.

Filtration is an important process, not only in sugar mills, but in a great many industries, such as chemicals, petroleum, coal, paper, cement, mining and refining, breweries, sewage disposal. Often both filtrates and sludges are corrosive, and thus it is that Revere Copper and copper alloys find many important applications. These metals are available in many different alloys and forms, resistant to a wide range of corrosive media. The Revere Technical Advisory Service will gladly collaborate with you in studying the problem of corrosion in your plant equipment or product.



Section showing method of locking copper screen into the extruded division strip by means of a zig-zag brass caulking strip.



Detail of formed or "bumped" brass screen support. The division strips are extruded brass sections.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York
Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere. Pacific Coast District Sales Offices in San Francisco, Seattle, Los Angeles

EARNING PROFIT IN THE EXPORT MARKET

(Continued from page 54)

they generally offer the best hope for success, "representation" here and elsewhere in this article is used to designate stocking distributors, who may sell to the trade direct, or to sub-distributors, or may even take orders for direct factory shipment.

There are several ways in which a manufacturer can build up a chain of foreign representatives. The most promising foreign inquiries will come as a result of domestic advertising. The Commercial Attache of our own State Department consulate in various foreign cities is a fair source of information. And generally, by writing the Chamber of Commerce of a foreign city, it is possible to obtain a listing of firms dealing in items in any particular category.

Clearly, representations must be assigned most carefully and only after careful investigation. As a general rule, extended correspondence with prospective distributors beforehand is believed a prerequisite even to personal trips to a potential market. Such trips are inevitably hurried, and there is a danger that the likeliest prospects, sound and qualified business men, will be repelled by what seems to them to be high pressure selling tactics.

It is self-evident that, other things being equal, nationals of the country involved will make the best representatives. After prospective representatives have been carefully screened through correspondence, it is well to call on our own U. S. Department of Commerce for a Trade Report on the firm in question. Such reports are supplied for \$1.00 each and provide a check on information previously obtained.

Almost without exception, the best foreign distributors are not interested in representing a U. S. manufacturer excepting only on the basis of exclusive representation within a given territory. This demand is not unreasonable, and a contract fairly protecting both the manufacturer and the distributor can be readily drawn up.

As a basic suggestion, such contract could be for a period of one year, renewing automatically on a year-to-year basis unless either party gives the other three months notice of intention to terminate. Such contract properly guarantees to the representative that he will be protected on all shipments of merchandise into his territory, irrespective of the nature of the sale.

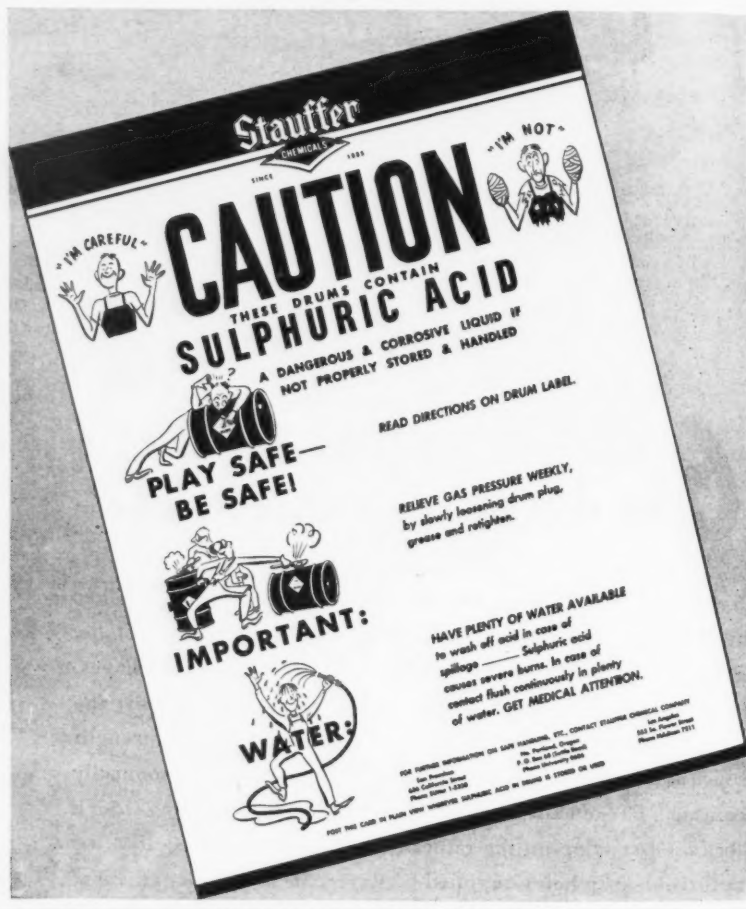
Many manufacturers make agency contracts dependent on the potential representative laying in a small stock of merchandise necessary to properly service the territory involved. The justification of such a requirement depends primarily, of course, on the nature of the product, and also on the prestige of the manufacturer.

As a final point, it should not be expected that the naming of overseas representation will be a simple, cut-and-dried job. One company, to the writer's knowledge, despite the most strenuous promo-

A SAFETY POSTER THAT REALLY GOT RESULTS

A good many business firms have found that the picture of a pretty girl (usually without too many clothes) on a calendar bearing their imprint, is a good piece of advertising. However, one old line Western concern has been distributing a poster stressing *safety* in the use of one of their products.

One of the products of Stauffer Chemical Company is sulphuric acid, a very tricky substance to work with unless treated properly. The poster calls attention, as is shown here, to the need for relieving pressure in sulphuric acid drums at regular intervals, and for keeping plenty of water handy in case of accidents. According to report, many firms using sulphuric acid have displayed the poster with good results.



tional effort, spent just over five years acquiring 42 overseas agents — on the average about eight a year. It should be expected too that, notwithstanding the greatest care, some selections will prove duds — to be suffered with for, at the most, a year. But for every dud named you can also expect to locate at least one star salesman who will teach you things you never suspected about moving your products.

(Concluded in October issue)

Expands to Eastward

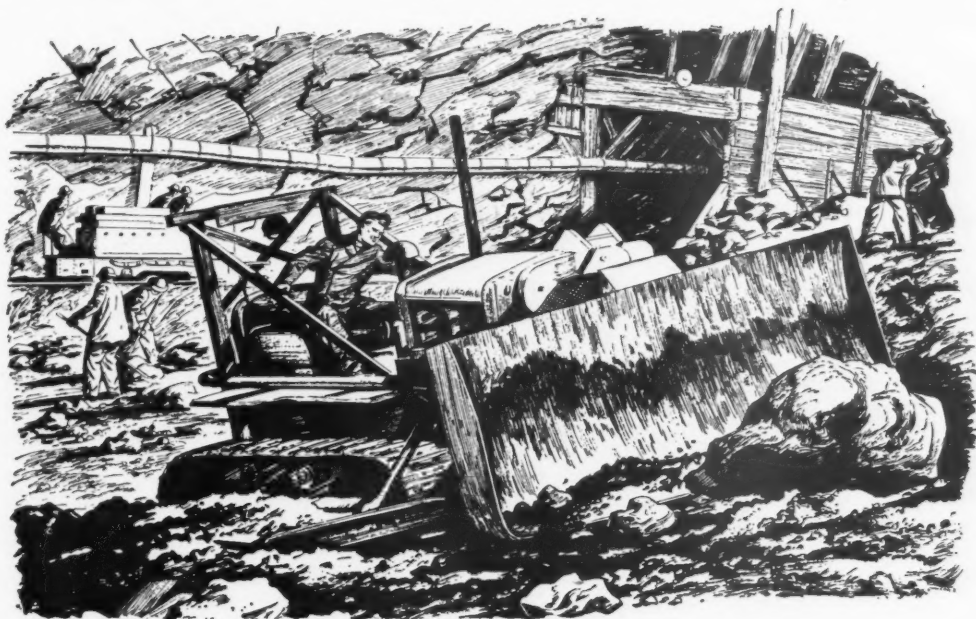
Originally planned only as an assembly and shipping branch in Chicago, Victor Equipment Company plans to expand its manufacturing activities in the new plant recently opened there, according to President L. W. Stettner. Victor already oper-

ates two main plants in San Francisco and Los Angeles. New high speed automatic machine tools are being installed to increase production of the company's line of flame welding and cutting equipment, because, according to President Stettner, the backlog of unfilled orders has been increasing in spite of overtime shifts at both Victor's Western plants.

Model Elevator

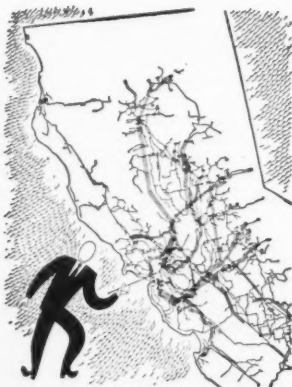
A working model of a freight elevator, constructed by the elevator engineers of the Division of Industrial Safety, California Department of Industrial Relations, was a featured exhibit at the Western Safety Conference at Los Angeles in June. This model, 3½ feet high, built for training and demonstration purposes, was made of clear plastic and polished brass so that all its parts were visible.

America's biggest power-building program going full speed ahead

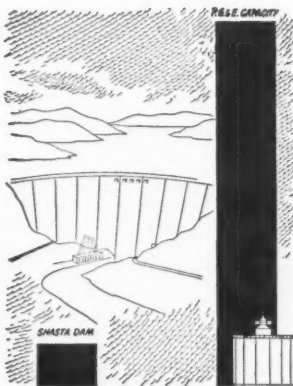


Nearly two million new electrical horsepower is on the way for Northern and Central California . . . and the dams, powerhouses and substations needed to turn it out are being built on a 'round the clock, 'round the calendar work

schedule. It's the biggest building program of any electric utility in America today—begun just after the war ended—already well along toward its goal! To give you a quick picture, here are some comparisons.



More power is being added than was needed to serve all of Northern and Central California before the war. Construction is speeding along at over \$10,000,000 a month.



Added to previous totals, this new power will give P. G. and E. a generating capacity eight times greater than Shasta Dam...three times greater than Hoover Dam.



Thousands of jobs have been created. Today 6,000 men are hard at work building the power needed to serve growing California...to serve you better.

Work never stops on our power-building program

P. G. and E.

PACIFIC GAS AND ELECTRIC COMPANY

WI-109-948

WESTERNERS AT WORK...

Arizona

Stanley A. Wilson, division manager for the General Petroleum Corporation, retired on August 1, and has been succeeded by Paul R. Nilsson, former assistant division manager. Mr. Wilson was identified with the Arizona offices of General Petroleum since 1938.

California

Manufacturing

New officers of Production Engineering Co., Berkeley, are Mrs. Marsha Farrell Hart, president; George Hart, exec. vice-pres.; T. H. Harvey, vice-pres. and secretary; K. Keresy, treasurer. All of these are directors, and the last three constitute the executive committee in whom management is vested. Walter Kassebohm, former general manager, becomes general manager of Moore Machinery Co., San Francisco.

Clifford V. Coons appointed vice-president in charge of sales for Rheem Manufacturing Co. His headquarters will be in New York. He started as a time-keeper with Rheem at the Richmond plant in 1934. G. M. Greenwood, treasurer, has been made a vice-president in addition to his present duties. He will continue in his San Francisco office.

P. V. Burke, manager Sacramento Box & Lumber Co., elected president National Wooden Box Association.

Aerojet Engineering Corp. announce the following appointments: W. E. Zisch, asst. gen. mgr. made gen. mgr., replacing A. H. Rude, who continues as v.p. and director. K. F. Mundi, chief eng., promoted to mgr. of eng. and mfg. C. C. Ross made chief eng., liquids, with R. B. Young as asst.; Dr. A. Antonio, made chief eng., solids, with W. E. Campbell as asst.

Martin B. Uhrich, formerly analyst of equipment maintenance for Goodyear Tire & Rubber Co. at Akron, appointed engineering manager of Goodyear's Los Angeles plant.

Milton Jellins has resigned as assistant vice-president of the Bank of America to become a vice-president and director of the management engineering firm of Amour, Keyes & Jarboe. Mr. Jellins served with Bank of America for 25 years, the last 14 in the executive department of the bank's head office.



Milton Jellins

Carl H. Wittenberg leaves managership of Southern Division, Columbia Steel, to become executive vice president of Gladding, McBean & Co., ceramics manufacturers.

Transportation

J. W. Corbett succeeds the late L. B. McDonald as vice-president in charge of operations for the Southern Pacific Company. R. E. Halliwell replaces Mr. Corbett as assistant gen. mgr.

Phillip Linnekin becomes assistant to the operating manager, American President Lines, following his resignation as first superintendent of San Francisco's new foreign trade zone.

Walter W. Linder named vice-president and director of all United States operations for Philippine Air Lines, with offices in San Francisco.

John Green has been appointed general superintendent of Bay Area ship repairs for Todd Pacific Shipyards Corporation, succeeding Nick Lehman, retired. Mr. Green was formerly marine department mgr. for McCutcheon & Sons.

Aircraft

Col. James M. Gillespie has been named assistant and technical advisor to J. C. Garrett, president of the Garrett Corporation, Los Angeles. His duties will be confined mainly to the AiResearch Manufacturing Company division, which specializes in high speed wheel development, gas and air turbines and similar products.

H. Fletcher Brown, vice-president of the Boeing Airplane Co., has assumed his new duties administering all Boeing sub-contracts in Southern California, with offices in Los Angeles.

Chester C. Fisk, formerly City Manager of Berkeley, has assumed the duties of Industrial Department Manager, San Francisco Chamber of Commerce, replacing G. L. Fox, now General Manager of the Chamber.



Chester C. Fisk

Steel

A. B. Ordway becomes a member of the executive staff handling the over-all policies of Kaiser industries, according to the announcement by Henry J. Kaiser. He has been associated with the Kaiser interests for 36 years, the last four as vice-president and general manager of the Iron and Steel Division. Jack L. Ashby has been named to fill the latter position. C. Bruce Wood, formerly controller of Kaiser Steel, will assist Mr. Ordway.

Ralph A. Krause named director of research for the Stanford Research Institute. He was formerly assistant to the president of Raytheon Mfg. Co.

Capt. Hugh E. Haven, U.S.N., has succeeded Capt. H. A. Ingram as commanding officer at San Francisco Naval Shipyard, Hunters Point. He was planning officer at Puget Sound Naval Shipyard during the war, and came to San Francisco from a post in the Bureau of Ships in Washington.

Oil

Reese Taylor, president of the Union Oil Company of California, and E. E. Pyles, Jergins Oil Company, Long Beach, are among oil men named to the 21-man committee set up by the National Petroleum Council to formulate the country's oil policy in the event of another national emergency or war.

Dr. Raymond H. Elwell, senior technologist for Shell Oil Company, San Francisco, recently was awarded the Medal of Merit, highest military award to civilians, for his wartime work on the development of incendiary weapons. Jellyed gasoline, widely used in flame throwers and bombs, was an important product devised by the group headed by Dr. Elwell.



John M. Peirce

John M. Peirce, for the past three years economist for the Western Oil & Gas Association, has been named executive secretary to succeed Don E. Gilman, resigned.

Marvin A. Crenshaw is newly appointed assistant to the vice-president-director of producing and manufacturing, California Texas Oil Co., Ltd.

Almon E. Roth, president of the Employers Council of San Francisco, has been appointed to the Labor Relations Committee of the Chamber of Commerce of the United States. He is the only Western member.

Howard A. Cook has been appointed associate educational director of the World Affairs Council of Northern California.

Corliss A. Bercaw appointed regional manager on the Pacific Coast for the Electro-Motive Division of General Motors Corp., succeeding Ernest Kuehn, retired.

Robert E. Shinkoskey named superintendent of the Selby operations of American Smelting & Refining Co.

Forrest D. Wallace has joined the Pacific Coast staff of McKinsey & Company, management consultants. He was formerly with F. D. Wallace & Associates.

John L. Elliott has been appointed vice-president in charge of Western operations of the Colgate Palmolive Peet Company, with headquarters in their Berkeley plant. He comes from Kirkman & Sons, Brooklyn, a subsidiary, where he was general manager.

Joseph B. Bransten elected president of M.J.B. Company, San Francisco, succeeding the late Edward Bransten, who headed the coffee company for 23 years. William H. and Edward Bransten, Jr., were elected vice-president and secretary, and vice-president and treasurer, respectively. Eugene Mignaccio is vice-president and manager of Western Can Company, an M.J.B. subsidiary.



George C. Kinsman

George C. Kinsman, former rate engineer for Pacific Gas & Electric Co., San Francisco, has joined the California Manufacturers Association to head the newly established department handling fuel, water and power matters.

E. W. Prout named manager in charge of operations for Fog Nozzle International, Inc., Los Angeles, succeeding W. E. Lundell, who has been appointed general manager of the Akron Brass Mfg. Co., Inc., the parent company, at Wooster, Ohio. Floyd J. Lee, also from the

(Continued on page 60)

The new Approach to *SULFONATIONS and Sulfations*



Less than twelve months ago General Chemical Research introduced SULFAN—Stabilized Sulfuric Anhydride—to the Process Industries. Even in that short space of time, many using SULFAN have predicted it may well “rewrite the book on sulfonation and sulfation!”

Important among the many reasons for this belief is the fact that SULFAN provides Sulfur Trioxide in stable, easy-to-use liquid form for the first time in chemical history.

In sulfations as well as in both mono- and poly-sulfonations, it offers multiple advantages:

- Eliminates costly, time-consuming neutralization and washing steps.
- Shortens processing time.
- Produces salt-free products.
- Obviates waste acid disposal.

Already finding a place in the textile, dyestuff, detergent, pharmaceutical, plastics and general organic chemical

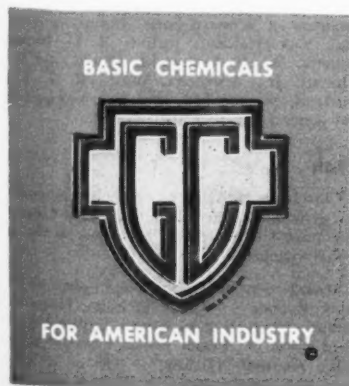
industries, SULFAN may hold a rich potential for your operations, too. Write for samples or commercial quantities.

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WESTERNERS AT WORK...

(Continued from page 58)

Los Angeles plant, has been named head sales manager at Akron Brass.

Charles E. Moore, Moore Machinery Co., San Francisco, is in Rome as head of the Industrial Division of the Economic Cooperation Administration's special mission to Italy. In 1940 Mr. Moore was industrial consultant to the Harriman Mission to England and during the war he served as president of Joshua Hendy Iron Works, producing EC-2 engines for Liberty ships.

Robert M. Van Valkenburgh named as business manager for the Research Institute, Stanford University.

Colorado



vanced to vice-president

Alwin F. Franz, vice-president in charge of operations for the Colorado Fuel & Iron Corporation and subsidiaries, has been elected a director of the corporation. Mr. Franz transferred from Buffalo to the Minnequa plant, Pueblo, as works manager in March, 1946, and advanced to vice-president in November, 1946.

Claude K. Boettcher has been elected president of the Ideal Cement Company, Denver, replacing his father, the late Charles Boettcher. Cris Dobbins, formerly vice-president and general manager, moves up to the post of executive vice-president and general manager, vacated by the younger Mr. Boettcher, and George W. Ballantyne, secretary of the company, has been elected to the dual position of secretary and treasurer.

Montana

Reorganization of the Montana Flour Mills Co. has resulted in Charles R. McClave moving from the position of president to chairman of the board of directors; he was succeeded by Paul R. Trigg. Charles G. McClave became vice-president in the place of Albert F. Strobehn, resigned. The latter continues as a member of the board.

William C. Searight appointed superintendent of the Montana division of the Railway Express Agency. His headquarters will be in Spokane. Mr. Searight replaced W. G. Watkins, retired.

Oregon

Capt. D. G. McGarity, formerly port director at Portland, has been appointed general manager of the Portland commission of public docks, succeeding George D. LaRoche, who resigned to resume private law practice.

L. E. Sullivan, Roseburg, has been elected first permanent chairman of the Douglas County Loggers & Lumbermen's Association. The group was formerly known as the Douglas County section of Western Forest Industries Association. R. H. Duncan, Drain, is new vice-chairman, and William Lindsell, secretary.

Robert O. Boyd, Portland attorney, was scheduled to return from Chicago about September 1 after acting as temporary referee in 47 deadlocked cases before the National Mediation Board.



Norman E. Bjorklund

Norman E. Bjorklund has been named assistant forester for the West Coast Lumbermen's Association. With headquarters in Portland, Bjorklund will supervise the Forest Industry nursery at Nisqually, Washington.

John Steele, former manager of the Frost-kist ice cream plant at Portland, has been appointed manager of the Lower Columbia Co-operative Dairy Association, succeeding Chester W. Laughlin, who retired in July after 27 years in the post.

Joe M. Crahan, Brownsville, is the new president of Western Forest Industries Association. Vice-presidents include R. U. Bronson, Eugene, W. P. Griswold, Drain, and R. J. Ultican, Jr., Aberdeen, Wash. R. T. Titus, Portland, was named executive vice-president and general manager, a new post.

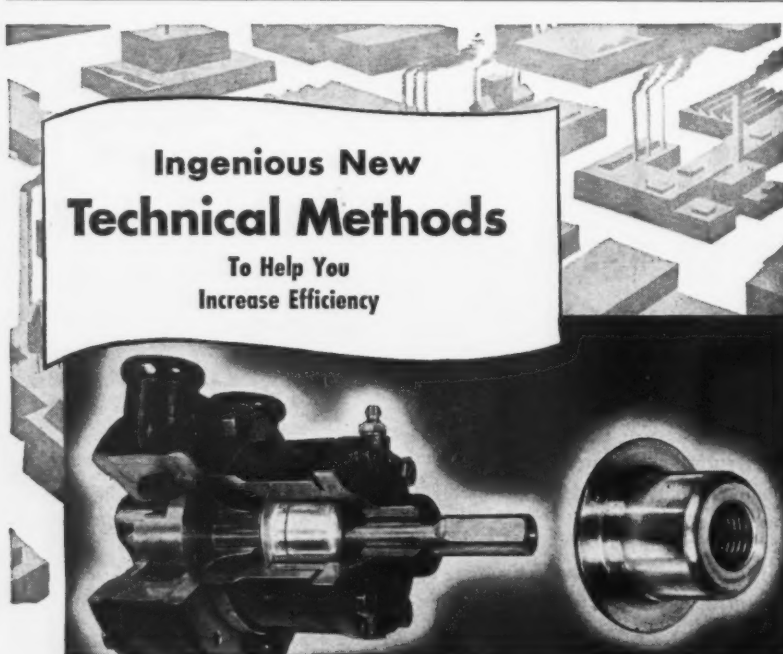
Utah

Claude P. Heiner has been elected president and general manager of the Utah Fuel Company, Salt Lake City; Herbert A. Snow is the new senior vice-president.

Management of the new Nephi plant of Thermoid Rubber Company includes Howard S. Fabian, production manager; Lester I. Berry, plant engineer; Frank Booth, production planning; Kenneth Hickey, in charge of power plant and maintenance; William Rudko, plant

Ingenious New Technical Methods

To Help You Increase Efficiency



New Cartridge Seal Solves Rotating Shaft Sealing Problems

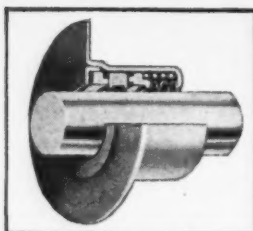
Stepped-up efficiency in sealing of rotating shafts can now be accomplished with a new Cartridge-type Seal mounted on the shaft.

The Cartridge-type Seal shown above is mounted within a Tuthill Pump. The seal contains all parts in one housing cup and insures positive double sealing. A high grade permanent lubricant is contained within the inside chamber of the housing.

Surfaces within the Cartridge-type Seal are lapped flat to within a few millionths of an inch to insure perfect mating. And, being a complete unit, only one mounting face is necessary. Clamps are eliminated, and adjustments or alignments are not required. Simply push the Cartridge-type Seal onto the shaft, tighten mounting screws and that's all.

Just as new engineering developments increase efficiency and performance, so can workers' efficiency be increased through the use of chewing gum. The act of chewing helps relieve nervous tension, thus helping to make the work go smoother and easier. That's why plant owners everywhere more and more are making Wrigley's Spearmint Chewing Gum available to all.

Complete information may be obtained from
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Cartridge-type Seal



AC-70

chemist and laboratory control director; **Milton Boswell**, purchasing, and **James Beard**, public relations.

W. P. Dunn, Keith O'Brien Co., elected president of the Salt Lake City Chamber of Commerce. **George R. Corey**, Utah Power & Light Co., is the new vice-president; **Wendell M. Smoot**, Utah State National Bank, treasurer, and **Gus P. Backman**, secretary.

Washington

Charles Williams has assumed the job of project superintendent, coordinating production-manufacturing problems, at the Seattle division of Boeing Airplane Co. Mr. Williams was general superintendent of Boeing's Renton plant during the war.

Nat S. Rogers, vice-president of Van Waters & Rogers, Seattle chemical firm, will this month assume his post as president of the Seattle Chamber of Commerce. Other officers scheduled for installation are **Willis Camp**, **Newman H. Clark** and **M. Dederer**, vice-presidents, and **Rex Allison**, treasurer. **E. L. Skeel** is the retiring president of the Chamber.

Simon Wampold, state supervisor of industrial insurance, has resigned to become a candidate for the Washington Supreme Court. **Joseph H. Davis** has been appointed in his place.

H. G. Decker is the new field man for the Coos-Curry Independent Lumbermen's Association, an affiliate of Western Forest Industries Ass'n. He was formerly with the Reedsport Logging Company.

George F. Baum, Seattle attorney, elected president of Tacoma Plywood Corporation. Other officers elected for the ensuing year include **A. J. Johnson**, vice-president; **Raymond D. Torbenson**, secretary-treasurer.

L. W. Albertson promoted to comptroller of the Spokane, Portland & Seattle Railway Co., to succeed **Robert Crosbie**, who retired recently after 38 years of service with the company.

R. E. Kucher elected chairman of the board of Washington Employers, Inc., succeeding **Ferdinand Schmitz**. **H. D. Hailey** was reelected president of the group, with **Phil Bannan** named vice-president in place of Mr. Kucher. **Lawrence Calvert** and **Darrah Corbett** reelected vice-president and secretary-treasurer, respectively.

H. R. Pirret, formerly of Tacoma, has been promoted to vice-presidency of the Southeastern division of General Mills, Inc., with headquarters in Atlanta, Ga.

John H. Zeller has been appointed technical director for the Pacific Northwest division of Reichhold Chemicals, Inc., Seattle. He has been with the firm 19 years.

Boeing Airplane Company makes the following promotions: **Edward C. Wells**, formerly vice-president-chief engineer, elected vice-president-engineering; **Lysle Wood**, formerly assistant chief engineer, appointed chief engineer; **N. D. Showalter**, former chief of flight test department of engineering division, appointed assistant chief engineer.

Associations Elect

Los Angeles chapter, Society for the Advancement of Management, elects **James N. Mills** of J. N. Mills Co., chairman; **Ed C. Osborn** of G. M. Giannini Co., Pasadena, vice-president; **Geo. H. Pickett**, Southern California Gas Co., secretary; **Paul A. Hopkins**, Sears, Roebuck, treasurer; **Edgar Williams**, representative to national chapter.

George P. Duecy, Associated Sand & Gravel Co., Everett, Wash., is elected president of the

Concrete Products Association of Washington. Other new officers include **A. B. Metcalf**, Columbia Concrete Pipe Co., Wenatchee, vice-president; **Talbot Campbell**, Seattle Concrete Pipe Co., secretary-treasurer; **H. C. Lutes**, Layrite Concrete Products Co., Spokane, director-at-large.

The San Francisco Bay Area Chapter of the California Society of Professional Engineers recently elected their first permanent officers. They include **Roger D. McCoy**, president; **D. J. Luchetti**, vice-president; **John L. Trebilcock**, secretary-treasurer; **A. C. Bullen**, C. S. Replogle, **J. H. Harrison** and **Larry Maringer**, executive committee. Bullen is also president of the California Society of Professional Engineers.

Harold Angier, Fresno, general manager of the California Grape and Fruit Tree Association, elected first president of the new non-profit Air Cargo Institute of California. Other officers are **L. R. Hackney**, Lockheed Aircraft Corp., 1st

vice-president; **J. P. Houghton**, Air Cargo, Inc., 2nd vice-president; **Lyman Lantz**, Chief of Aeronautical Development, California Aeronautics Commission, secretary; **A. Y. Preble**, York Refrigeration Co., treasurer; **Edgar G. McLellan**, E. W. McLellan Co., chairman of the board.

Claire V. Goodwin, president of the Oakland Board of Port Commissioners, elected president of the California Association of Port Authorities.

Samuel T. Dickey, Castle & Cooke, Ltd., San Francisco, is the new president of the Purchasing Agents' Association of Northern California. **Arthur J. Melka**, Hydraulic Dredging Co., Ltd., Oakland, is 1st v.p.; **Harold R. Morrison**, Union Oil Co. of Calif., San Francisco, 2nd v.p.; and **Bernard E. Gobel**, Steel Tank & Pipe Co., Berkeley, secretary-treasurer.

W. L. Haley, Seattle, elected president of the American Association of Cereal Chemists.

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Supersonic Engineer Shortage Cramps Aircraft Program

Jet Propulsion and Radar Technical Developments Have Outmoded the Wartime Skills of Designers and Aerodynamicists; Sub-contracting May Be Solution of Dispersal Problem; Fontana Gets Satellite Plant

LOS ANGELES—Something akin to the fabled "world's largest midget" is developing in the aircraft industry of southern California: a manpower shortage that isn't a manpower shortage, but rather a painful scarcity in the midst of plenty.

Spot shortages of manpower are no novelty in aircraft manufacture — a new model always brings a momentary scramble for engineers, draftsmen, and others needed in design work. Later the cry is for jig and fixture builders and tool and die makers, while actual production soon brings the customary clamor for riveters, bench workers, and electricians.

Now, however, a tremendous plunge into uncharted fields of aviation has intensified the headaches of the initial stage. Men with actual experience in engineering the new jet-propelled behemoths and supersonic fighters are almost non-existent.

Engineering Elite

No common engineers, these. They are the elite guard of the aircraft builders—designers whose ability to create flight-worthy, Buck Rogers craft upon the drawing board lifts them to the \$7,000 to \$10,000 bracket; aerodynamicists whose skill in the abstruse mathematical field of airfoil design enables them to command salaries of \$12,000 to \$15,000 per year. Others are persons less profoundly versed in engineering science, but with first-hand experience in the Never-Never realm of supersonic flight and jet propulsion.

Most of these are quite young, even draft-vulnerable. A peculiar quirk of the problem is the fact that some of the technicians the aircraft makers would like to groom for the expanding requirements of this field are presently unemployed and virtually unemployable because they are members of the military reserve. Employers are understandably reluctant to tie up large sums in training, only to have their new experts called back into service by Army or Navy just when they are needed most.

Northrop, which always has been primarily a developer of advanced new de-

signs, rather than a mass producer of line planes, is particularly feeling the pinch. Its engineering department, which at war peak of the Black Widow P-61 program numbered about 650 persons, currently has 1,100 on its payroll and expects to employ a total of 1,500 to meet requirements of its schedule.

Engineering Manager Arch Dutton, who is canvassing the nation for the 400 engineers needed, says a major factor in the "spot" shortage is the greatest engineering manhour requirements for today's high-speed, high-performance planes. Merely the testing of component parts of a new model, for instance, requires more manhours than were spent in pre-war days for a complete engineering job on a new model. It is easy to understand how the cost of developing a new plane has risen from a prewar figure of perhaps \$600,000 to a present \$3,500,000 for a modern jet job.

Aircraft manpower experts are aware that acute shortages in certain jet propulsion and radar technical fields lie ahead, and that they will have to repeat the systematic upgrading that solved similar problems during the war. Jobs will have to be broken down into their elements so training programs can be applied to develop partial skills. An aircraft electrical man, for instance, will be converted into a radar electrician through instruction in the required phases of this field.

When activity has moved along the normal cycle from the design and tooling stage to the line production phase, employers will have to relax their hiring specifications to tap latent resources of manpower. Should industrial activity continue its present upswing, it is quite possible that the days of Rosie the Riveter may return again.

Situation Takes Shape

Confusing as the local manpower situation has been during recent months, its outlines now are beginning to take shape somewhat as follows:

(1) People have continued to pour into southern California, adding constantly to the already great pool of unskilled and

semi-skilled labor. First half of the year brought 1,183,170 people by auto from other states, an all-time high. The unskilled worker has found it hard to get a job. Personnel directors have been exceedingly choosy about hiring women and older men.

(2) Recently the labor market has begun to tighten up — some six months after similar tendencies appeared in the east. Result is that more people are working than at the beginning of the year, and despite the high in migration here, fewer are drawing unemployment pay.

(3) The 70-group air force program has had the immediate effect of halting a long series of layoffs in the aircraft industry which by now would otherwise have put still more thousands of employees out of a job. Although some observers estimate that next year, perhaps 6,000 to 10,000 additional people will be needed in the industry, major companies maintain they expect to handle orders thus far awarded with substantially the same staffs as at present, except for a few technical experts.

Machinists at Premium

But expert machinists are already at a premium, for busy job shops have snapped up most of the qualified men in the area. Oil tool manufacture is booming and a step-up in shipyard repair work is in the offing. These demands are skimming off the cream of the skilled manpower supply. There will be leaner pickings by the time the orders for airplanes have been translated into new business for makers of landing gear, air-conditioning and refrigeration equipment, radio and electrical gear, jet engine accessories, and reciprocating engine exhaust systems.

Subcontracting is on the rise. Northrop has been negotiating to place some production of its new B-49 bombers with Consolidated-Vultee's Fort Worth plant. Having designed the revolutionary flying wing, Northrop lacks the space needed for production of these giant ships, according to company announcement. The word is interesting, however, in view of the Air Policy Commission's recommendation that

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"wanna start
somethin'?"

use a  motor starter

These G-E combination starters give your motors money-saving protection—three ways. Providing short circuit, overload and undervoltage protection, they save you installation costs because fuses, disconnect switch and magnetic starter are all in one unit. Whatever your operating condition, there's a combination starter to do the job. See bulletin GEA-3571A for details.

MORE G-E STARTERS General Electric has a complete line of motor starters, manual or magnetic, full- or reduced-voltage, reversing or nonreversing from 1 to 1000 horsepower ratings. All G-E starters come in a variety of enclosures. For more information on all G-E starters, including those shown below, ask your nearest G-E office for catalog GEA-642. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.



CR1061 G.E.'s smallest, most inexpensive starter for manual control of single-phase, f-hp motors.



CR1062 Sturdy, low-priced starter for manual control of single and three-phase motors up to 7 1/2 hp.

CR1034 A simple, manual, reduced-voltage starter for preventing voltage dips and shock from too sudden starting of motors ranging from 5 to 200 hp (four sizes).



Polishing off "Mix-All" food and drink containers is the job of this unique, automatic, rotary table-type buffing machine built by the Square Deal Machine Company of Los Angeles for Western Die Casting Company. Continuity of operation is assured because combination starters, in one compact unit, protect your motors from short circuits, overloads, and undervoltages.

GENERAL  ELECTRIC

676-274

(Continued from page 62)

aircraft production be spread more widely throughout the country, rather than concentrated on both seacoasts.

Already United Aircraft has begun to remove its Chance Vought division, lock, stock, and barrel, from Stratford, Connecticut, to Dallas. As predicted in *Western Industry* several months ago, subcontracting may be the means of decentralizing production so as to avoid concentrating key manufacturing processes in areas vulnerable to attack. While this may provide broader sources of manpower, particularly in the less skilled brackets, it may tighten further the local shortage of top specialists, who will have to be borrowed from Western plants to get the subcontract work started.

Integration of Steel Industry

Integration of southern California's steel industry moves briskly along. Last spike has been driven in the 153-mile railroad which Kaiser construction crews, pushing across the desert with typical all-out Kaiser hustle, have built in the past 11 months. A diesel locomotive will move ore trains from the Eagle Mountain iron deposits to the S.P. mainline and thence to the Fontana mill, at a substantial saving over present truck haulage costs.

Next door to the Kaiser mill, the former 155-mm. shell plant operated by Kaiser during the war has been sold by War Assets Administration to Taylor Pipe and Forge.

The latter Chicago firm will take advantage of proximity to a source of strip and skelp to turn out spiral-weld steel pipe of six to 36-inch diameter, and within a few months will add heavy forging to its operations.

Local industrialists, who have been hoping that abolition of the basing point system may attract some of the heavy industries needed here for a well-rounded manufacturing economy, are delighted with the news. The \$5,500,000 shell plant was a problem child for WAA, which found it hard to sell — perhaps because as originally equipped it was virtually a single-purpose plant, perhaps because it shared the Fontana steel mill's strategy-dictated disadvantage of location 70 miles from tidewater. It finally had been earmarked for "pickling" as a military stand-by plant.

The new steel pricing system probably had little to do with bringing the Chicago firm West. More likely it was the tremendously expanding world market for pipe and heavy equipment for the oil industry, plus a long-term demand from the West's vast heavy construction, that prompted the Taylor company to make its seven-figure investment here. The plant will retain its strategic value through a clause providing that in event of a national emergency, it would be restored within 120 days to operate as a shell plant.

The steel industry is trying to do its part in eliminating smoke from the once-clear skies of this sunkist paradise. Beth-

lehem has just imported from Cleveland an elaborately contrived pilot plant with which it hopes to capture dust-laden fumes from one of its open-hearth furnaces, cool and scrub them with water, and turn them out thoroughly purified. Experts have their fingers crossed because little success has been encountered on de-fuming open-hearth operations. One of the most unpromising sources of "smog" has been the many small foundries from which smoke pours through open roofs to add their burden to an atmosphere already bearing its burden of oil refinery sulfur, smoke from burning refuse dumps, and backyard incinerators.

More Automobile Expansion

Los Angeles County's air pollution control district has moved in on dump operators of the area and is forcing city dads to cut-and-cover refuse instead of burning it. "Smog Czar" Dr. Louis McCabe, top-flight expert imported from the U. S. Bureau of Mines, has asked for four more technical specialists for attacking knotty chemical problems encountered. Many industries are voluntarily requesting aid in planning smoke or dust-control installations for their plants and it looks as if the struggle, though long, may result in restoring southern California's well-advertised sunshine to its original high vitamin content.

The local automobile industry grows and grows. Willys-Overland has decided to en-



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The West's primary source of quality lighting equipment. The SMOOT-HOLMAN label is certification of dependable construction... your assurance of maximum performance with minimum maintenance cost.

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Offices in principal western cities —
Branch and Warehouse in
San Francisco

large its Maywood assembly plant to supply nine Western states with its jeeps and trucks. The new Auto Weld plant at Whittier will supply seat frames for Ford's Western plants at Long Beach, Los Angeles, Richmond, and Dallas. Western Mouldings and Stampings will manufacture stainless steel mouldings and window channels, and a Wisconsin maker of radiators for Ford is planning to move certain operations here, including fabrication of lower tanks and tubes. Other "loose parts" soon to be manufactured locally are completed tail pipes, radio sets, paper linings for glove compartments, door panels, and more malleable castings.

Douglas Aircraft is planning to enter the pressed metal field on a substantial basis and has engaged Harry Woodhead, former Consolidated-Vultee president, to head the new undertaking. Since the company's huge hydraulic presses, although built for stamping aluminum plane parts, are adaptable to the handling of sheet steel, no large investment will be required. Products to be made have not been announced but it is rumored that auto fenders and radiator shells are high on the list for consideration.

Parker Appliance soon will double its facilities for production of its new gate valve and high pressure check valves. For this purpose it has bought Air Associates' modern plant at Inglewood and plans to expand production of other types of aircraft valves and flared tube couplings as soon as additional machinery can be installed.

A study issued by the State Board of Equalization reveals that, as of March 31, 1948, there were 273,185 retail outlets in California, compared with 255,378 a year ago, an increase of 7 per cent.

If proof were needed that California is a highly motorized state, it is to be seen in the fact that of the total outlets listed as paying retail sales taxes, 39,375 were classed as service stations, garages and auto supply stores.

New Service Dept. For Ford Parts

The most recent step in development of the Ford Motor Company's West Coast Parts Purchasing Program is the establishment of a central follow-up and scheduling department at Los Angeles, to serve the Richmond and Long Beach assembly plants in California and also the Dallas plant in Texas.

This department will check inventories with each of the three assembly plants and decide what to release from suppliers in the West. It is expected to smooth out the flow of parts and simplify production for the vendors as well as the Ford Motor Company.

Two additional West Coast suppliers have appeared in the Ford parts picture. Western Moulding & Stamping, Inc., who have taken over the Benton Ballou plant

in Ontario and are spending \$150,000 to equip it to manufacture metal trim mouldings for automobile assembly and home appliance uses. Howard A. Burelson is president of this concern. Modine Radiator Co. of Michigan will build a radiator plant in Los Angeles. It is expected also that Essex Wire Co. will produce wiring harness at their new plant in San Diego.

Fuel Briquetting

Although national production of fuel briquets rose to a new high in 1947, total output of the three Pacific Coast plants engaged in this business dropped to the lowest point in five years, or 115,057 tons. In 1946 the Pacific Coast volume was 137,-

684 tons. Shipments from Oregon dropped from 95,688 tons in 1946 to 67,642 tons in 1947. On the other hand, Washington output rose from 6,923 tons to 22,092 tons.

Montana Output Up

An increase of 172 per cent in the zinc output set the pace for a marked improvement in most phases of Montana's metal-mining industry in 1947, compared with 1946, according to the Salt Lake Office of the Bureau of Mines, United States Department of the Interior. Remaining metals, except copper, also gained appreciably in output — lead 95 per cent, silver 93, and gold 28; copper output, however, was 1 per cent below that in 1946.



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State's Northwest Corner Has Development Spurt

**Plywood and Douglas Fir Logging Operations
Becoming Strong Factor in the Redwood Empire;
Philippine Trade Possibilities Are Opening Up**

SAN FRANCISCO—One of the least publicized developments in northern California is the big spurt in lumbering in the northwestern corner of the state. There scores of medium and small sized lumber mills have sprung into existence in the last five years, dozens of planing mills and remanufacturing plants, to say nothing of the entry of plywood operations.

Nine veneer and plywood projects are either in operation, under construction or projected. Two big ones nearing completion on Humboldt Bay rank with the best plywood plants in the Northwest. As a result of all this development the Redwood Highway, once mostly a pleasure thoroughfare, now is choked with logging trucks.

Actually, the "Redwood Empire" is no longer strictly such, because Douglas fir now accounts for a third of the output from the redwood country. It is estimated that the number of mills cutting Douglas fir in the three counties of Del Norte, Humboldt and Mendocino is more than 350, and the annual cut is now around 300,000,000 feet a year. Both the West Coast Lumbermen's Association, which serves the Douglas fir industry of the Northwest, and the Pacific Lumber Inspection Bureau now offer grading and inspection services to California mills.

Redwood operators are investigating the possibilities of relogging their holdings after the big timber has been taken off.

Philippine Trade

One of the first big steps toward restoring prewar trade with the Far East was taken when the San Francisco Chamber of Commerce initiated a Philippine Trade Conference in Manila a few weeks back. The need is shown by the fact that the total volume of trade (excluding coal) handled through Pacific Coast ports suffered a 54

per cent decrease in May of this year under May, 1947. All coastal regions suffered, but to a lesser extent, North Atlantic falling off 45 per cent and the South Atlantic ports 10 per cent.

Out of this conference came permanent working committees to exchange reports, discussions of current problems and other matters on a regular basis. President W. P. Fuller Brawner of the San Francisco Chamber reported that the import-export controls established by the Philippine government were not designed to restrict American business or investments, but only to restrict importation of non-essential goods and channel the Islands' limited capital into the purchase of essential products.

Some of the participants in the conference thought a system of tariffs would bring branch factories from the United States, but all agreed that more American capital and know-how must come into the Islands. The session was not just a long-range proposition, for various spot deals were made and agencies set up. Incidentally, one of the prospects is the importation of mahogany to the San Francisco Bay area for use in manufacturing furniture, an industry which has gained in employment in the area faster in the last year than the average gain in the durable goods industries.

Stanford University's annual business conference, the second since the war, drew some notable figures this year and also brought in a more representative attendance from all parts of the state than ever before. Last year Sumner Schlichter from Harvard and Herbert Hoover were the big attractions. This year one man covered the whole range from the engineering approach to management clear through to the national economic picture. He was Senator

Ralph Flanders of Vermont, president of the Jones & Lamson machine tool works. Other important easterners included K. T. Keller, president of Chrysler Corporation; the meteoric Don G. Mitchell, president of Sylvania Electric Products; and Leo Wolman, New York economist. Industry and business in California were also well represented on the program.

Air Freight Possibilities

An air freight forecast has been issued by the San Francisco Bay Area Council in a study of airports. Daily in and out schedules could run as high as 63 in 1950 and 200 in 1955, the study predicts, for transporting such products as flowers, meat, fish, clothing, newspapers, books, chemicals and machine parts.

The Council reports that although the Bay area in 1946 had 27 per cent of the state's population, it had only 11 per cent of the total civil airports and only 42 per cent as many airports per capita as the state at large. The nine counties have only 12 per cent of the private aircraft in California, which, it was stated, may be due in part to lack of airport facilities. The Council recommends the establishment of at least 25 more airports, including at least two major terminal airports equipped with passenger and warehouse facilities for the entire area.

Steady growth of the civilian aircraft industry is indicated in the California Aeronautics Commission's report that registrations have more than doubled in the last two years, the total on June 1, 1948, being 10,560 compared to 4,878 two years ago. This is not due merely to growth in population, for there were just over five airplanes for each 10,000 population in 1946, and this year more than 10 for each 10,000 population.



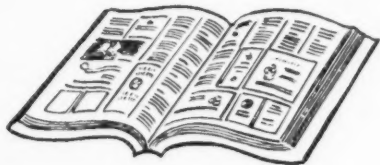
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Rocky Mountain Dollars Need A New Burst of Energy

Ultra-conservatism Still Grips Banks and the Politicians Are Mostly Against ERP; Doubts About Wool Processing Possibilities; Electric Power Developments May Be the Big Energizer

DENVER—Reaction and a pulling-back was evident in the mountain states area during the past month or so, perhaps reflecting the shakedown in the stock market and perhaps showing that the natural timidity of the people in the Rocky Mountain region is overcoming their brash postwar ebullience.

The change was manifest in many areas of activity, but particularly in banking circles. At Denver the United States National Bank, which has grown fast under the leadership of J. Howard Ferguson, let him be taken away by the Republic National Bank of Dallas. Insiders saw this as a triumph for the conservatism of Thomas A. Dines, board chairman, and his son, Thomas M., who emerges in the seat vacated by Ferguson as president of the bank. What looked for a little while like a new forward-looking era in Rocky Mountain banking circles seems to have petered out.

At Casper the same ailment seemed to be evident in the Casper National Bank, which opened an oil loan department a year or two ago under the direction of vigorous young O. H. "Tex" English. Now English has left the bank to engage in oil deals on his own account, and the bank seems more than ever in the grip of conservative ranchers and smalltown businessmen who will let outsiders do all the financing that involves any risk — and any chance of large returns.

Mirror, Mirror, Tell Me True . . .

Mountain states industrialists, labor leaders and other bigshots exposed themselves to some fresh thinking and candid stock-taking at Laramie last month when the University of Wyoming held its fourth annual forum on labor, agriculture and industry.

The area is doing very well, according to Charles E. Brokaw, regional director of the U. S. Department of Commerce, who journeyed from Denver to Wyoming's only college town. He pointed out that the European Recovery Program is doing wonders for the region's economy, which has been pegged up by one shot-in-the-

arm or pump-priming program after another since the early '30s.

Industry is humming with ERP orders, Brokaw declared, pointing out that 9,000 Denver workers now making their living by manufacturing goods for export, not counting those engaged in other processing work, for domestic users. The world now turns to the mountain states for many products previously obtained from foreign countries. The region's exports of rubber products climbed 550 per cent, compared with prewar figures, serums and vaccines are up 400 per cent, just to mention some examples.

Of course, it is food exports that are making the region prosperous to the greatest extent of all, Brokaw emphasized. ERP has kept prices up at a time when they would have gone down otherwise, and the Department of Commerce official stated that the flood of ERP money is just beginning to percolate around for the general benefit of the populace.

This is particularly interesting when one remembers that those sterling specimens of democracy, the Congressmen and Senators from the mountain states, voted *against* ERP and other measures designed to promote worldwide recovery — with very, very few exceptions. Presently Colorado will vote, as will other states, and quite likely the same three Republican Congressmen from outside of Denver will be selected by the voters to represent them in the lower house of Congress.

And it is practically a cinch that Senator Edwin H. Johnson, a Democrat who opposed ERP and virtually everything else favored by the Marshall - Vandenburg forces, will go back to Washington for another six years of unpredictable obstructionism. There is a nice young 17th Street blueblood running against Johnson on the Republican ticket, but his chances are considered very slim at this writing. Also there is a primary contest confronting Senator Johnson, and it is barely possible that the popular support behind youngish Gene Cervi will snowball into an upset for Big

Ed — but don't be betting any money that way unless you have some you're ready to lose.

Mighty Sick Elephant

The what-the-hell attitude or tired feeling now so evident in the mountain states is manifest again in the candidates put forward by the Republican party in Colorado. In a year when almost any Republican might be considered an odds-on favorite to win, the party leadership in Colorado virtually lets the governorship go by default by designating as its candidate a non-entity named Hamil from some place named Atwood.

It is an absolute fact that not one out of 100 voters ever heard of Mr. Hamil before and probably no larger number ever heard of Atwood. We have a postal guide for looking up such places, and found that it is in Logan County. "An unincorporated village in the dry farm area," is the Colorado Guide Book's designation of Atwood, which is in the northeastern corner of the state near Sterling, where the crops grow plenty good and country banks bulge with profits from wheat, sugar beets, fat sheep and cattle and once turned out a high school basketball team that licked the best in the country for an unforgettable national championship.

Mr. Hamil is opposing Governor Wm. Lee Knous, a towering rancher-jurist who has been in Colorado public life for many years and hails from the world-famous Gunnison fishing country on the Western Slope. In addition to letting Mr. Knous remain in office as governor, the Republicans have pretty well passed up their chance to do anything about the Senate seat, as discussed above, and for the task of opposing hard-hitting young John Carroll as Denver's Congressman the Republicans have put up Chris Cusack, an advertising agency operator whose vote-getting ability is rated way down the line compared to that of Mr. Carroll.

Whether it is because Republicans just don't care who holds the offices or can't

(Continued on page 70)



PABCO Trailerizes with FRUEHAUF

Hauls Bigger Loads Faster Than Formerly With Trucks



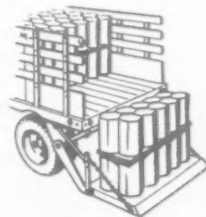
THE Paraffine Companies, Inc., has discontinued "bob-tail" trucks that formerly served its huge Emeryville plant and replaced them with tractors and Fruehauf Trailers. Payloads now are practically doubled, the entire delivery system has been speeded and transportation costs reduced substantially, according to J. B. Lee, Plant Manager.

The Paraffine Companies, Inc., is a prominent western manufacturer. Under the famous Pabco brand, it produces and distributes paints, roofing, linoleum, insulation and other building materials. For many years it operated its own fleet of trucks to supply its wares to customers in the San Francisco Bay district.

Then, recently, as many other industrial enterprises throughout the country have done, this company determined efficiency could be increased and

costs cut by converting its trucks into tractors and installing eight Fruehauf Trailers with automatic Supports. Its automatic Supports for faster, safer coupling. While some Trailers are being loaded or unloaded, the tractors are pulling others to delivery points and returning empties to the plant. It's the shuttle method of Trailer operation.

If you would like to know more about Trailer hauling — any kind of Trailer hauling — call your nearest Fruehauf Factory Branch for full particulars. Two of the Paraffine Companies' Trailers have the Fruehauf 2,000-lb. power Elevating Endgate. Ask about this labor-saving device also.



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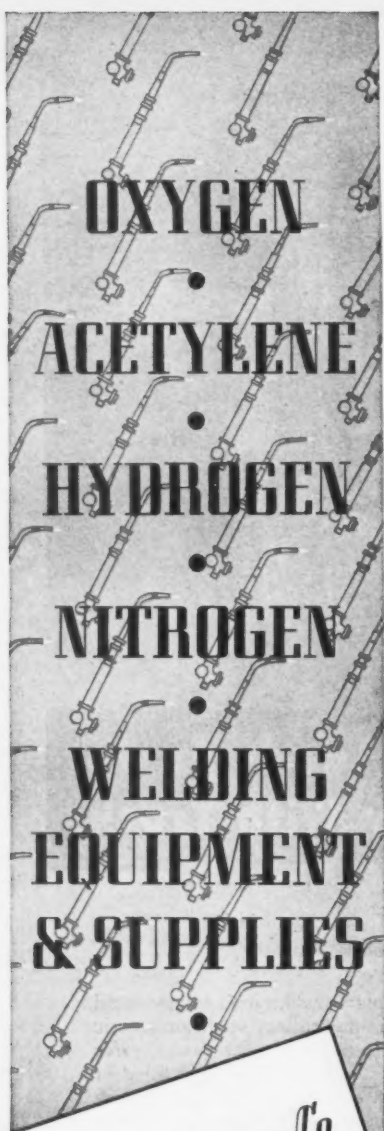
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September, 1948—WESTERN INDUSTRY



This is a fast-moving
efficient organization
of competent people,
always ready and able
to serve you well.

(Continued from page 68)

pry its more glamorous figures away from their counting-houses and gold mines, we haven't discovered. But it does seem that the Colorado segment of a certain political party noted for nominating and electing Abraham Lincoln needs a dose of Carter's little pink pills, or something, to bring back the old fighting spirit.

California Wool Plants?

Dreams of the mountain states feature big wool processing plants, but maybe California will turn out to be the place where the woolly stuff is processed, according to Sylvan J. Pauly, president of the National Woolgrowers Association.

Pointing out that markets have something to do with the location of processing industries, Pauly emphasized that the mountain states have a long way to go before they can hope to overcome the many obstacles in the way. He stated that California already has a large clothing industry and fast is winning national leadership as the style center of the western world. Moreover, California has plenty of financiers—men who welcome risks—to start a wool processing industry in an area where a great undeveloped market is right at hand. Finally, California has the climate and other factors to make a successful wool processing industry. In a battle-royal with New England processors, California would have resources for the fight that might not be found in adequate supply in the moun-

tain areas. However, he pointed out, wool-growers had better be friendly with eastern processors "since they furnish the only market for 90 per cent of our product."

Pauly spoke harshly of the policy invoked recently whereby the U. S. Treasury lost \$30,000,000 a year in wool tariffs when the rates were slashed 25 per cent. So far as the American consumer was concerned, he declared, the benefits were cancelled immediately by the British Empire's action in raising the price of raw wool by exactly the amount of the tariff cut—81½ cents per pound. So far the tariff cut hasn't hurt American woolgrowers, he says, but it will hurt them badly if wool again becomes surplus in the world market.

Super Power Coming

Temporary slumps in the vitality and aggressiveness of people in the mountain states will have no effect on the long-range pattern now developing. Power from the countless tons of water that cascade down the mountains on both sides of the Continental Divide will unfold a great destiny for this region.

In 1949 the expenditure of the U. S. Army Engineers for power, irrigation, flood control and other work on America's rivers will hit a new high of 573 million dollars. At the same time the U. S. Bureau of Reclamation will be spending \$251,000,000, another record high. When 1949 ends, Uncle Sam will have invested \$4,000,000,000 in a power-happy future, with

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that incredible figure only a healthy start on the vast program now unfolding for the years immediately ahead.

This program will double the power capacity of the whole nation. It will expand the present 600,000 acres of federally-irrigated lands to about 10,000,000 acres, or an area equal to New Jersey and Massachusetts combined. The lakes created in this gargantuan task will spread over an area twice the size of Connecticut. As A. Lincoln remarked, the world will little note nor long remember what we say here, but it will never forget . . . at least it will have evidence before its eyes for a long, long time of what the dam builders and other engineers are doing to our land.

Gold Is Cheap

Don't go out and buy a gold mine, unless you want a headache. If you don't think gold mines are headaches, look around you. Homestake, at Lead (call it Leed) in South Dakota's green Black Hills, is working at little more than half its prewar scale and Homestake is the bellwether of all American gold mining operations because it can work more efficiently on lower grade ore than anybody else can. Gold production last year was just three-fifths the 1940 figure.

Many of the great gold mines haven't opened at all, since the government closed them down during the war to conserve manpower for more important purposes. If it weren't for gold produced as a by-product in other mining operations, there wouldn't be much coming out of the ground these days. Same old story—costs have risen too fast to make the operation profitable. The ceiling price on gold still is there, with the U. S. Treasury insisting that it have all the new gold mined but refusing to pay more than the 1934 figure of \$35 an ounce for it. Homestake calculates the rise in mining costs at 50 per cent about 1941 figures, and 1941 was a lot higher than 1943. Base metal mines, whose products aren't under ceilings, get the miners away from the gold properties, by paying higher wages.

First Ship Docks in Foreign Trade Zone

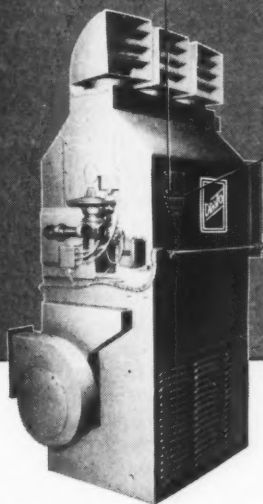
A cargo of 300 tons of bamboo rakes from Japan was discharged in San Francisco's new Foreign Trade Zone recently by the President Taft, American President Lines vessel. The Taft was the first ship to dock in the new Zone.

Business is growing steadily in the Zone, officials report, with nearly 1,300 tons of imported cargo moving into the facility.

Western Percentage Grows

Deposits in the banks of the 12th Federal Reserve District increased from 8.9 per cent of the country's total in 1941 to 11.7 per cent in 1947.

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REGIONAL REVIEWS

THE PACIFIC NORTHWEST

Reclamation Bureau to Begin Columbia Diversion Study

\$60,000 Is Earmarked for First Investigations in Advance Of Action on Welch Resolution for \$250,000 Appropriation By Congress; Big Pulp Developments in Alaska Lie Ahead

PACIFIC NORTHWEST—First definite steps toward investigating the feasibility of diverting surplus Columbia River water to California have been taken by the U. S. Bureau of Reclamation by earmarking \$60,000 for studies in the coming year.

"Reconnaissance" surveys will be made and the project will be arbitrarily assigned the name "United Western Project" for internal administrative use, so James A. Ford, executive secretary of the Spokane Chamber of Commerce, has been notified by William E. Warne, assistant secretary of the interior.

This small allocation of planning and engineering funds, which will not permit much more than an office study, was made by the Bureau in advance of action in Congress on a resolution introduced by Representative Welch of California, authorizing a \$250,000 appropriation for a comprehensive engineering study.

The Bureau's allocation is \$20,000 each to Region 1, which administers the Columbia basin, and Region 2, covering the California Central Valley. Also there is \$12,000 for the lower Colorado basin, which comprises Region 3, and \$8,000 for Region 4, including not only the upper Colorado basin but also the great interior basin of Nevada and western Utah.

The Welch resolution calls for taking water which would not be in any way useful to Oregon, and the Bureau's idea is diverting below Bonneville or even below the mouth of the Willamette. This would involve pumping water over the Siskiyou Mountains into the Sacramento River, and would supply only the northern and central part of California.

Bigger Things Planned

But the earmarking of funds for Regions 2 and 3 indicates to some close observers that the Reclamation Bureau has by no means abandoned its carefully guarded ideas for a super-gigantic diversion of upper Columbia basin water to other major watersheds of the West, in-

cluding the Colorado River, with ultimate delivery to Arizona and southern California. It is worthy of note that the Snake River, tributary of the Columbia, the Yellowstone, a tributary of the Missouri, and the Green, a tributary of the Colorado, all rise within a few miles of each other, near the southern boundary of Yellowstone National Park.

Alaska Pulp Prospects

Ketchikan Pulp & Paper Company's successful bid for 8,000,000,000 feet of timber in Tongass National Forest is only the first of the pulp ventures in southeastern Alaska, according to Secretary of the Interior Krug. He predicts that all five of the preferred pulp mill sites will be taken shortly. The company has made a 50-year contract with the U. S. Forest Service for development of the timber.

Recently the company purchased a plant site near Ketchikan, and plans to begin building in the summer of 1949 a mill capable of producing initially 300 tons daily of dissolving pulp for use in making rayon and other products. It will take probably three years to complete the mill. Timber reserves acquired from the Forest Service are sufficient to sustain a 500-ton mill.

Ketchikan Pulp & Paper Co. was organized early in 1948 to carry on explorations into the possibilities of utilizing the forest resources of Alaska, which were initiated in 1946 by Puget Sound Pulp & Timber Co. American Viscose Corporation, large consumer of dissolving pulp, is associated with Puget Sound Pulp & Timber Co. in ownership of the common stock of the Ketchikan company. Officers and directors of Ketchikan Pulp & Paper Co. include Fred G. Stevenot, chairman of the board, Lawson P. Turcotte, president, and Robert H. Evans, vice-president and counsel. Mr. Stevenot is president of Puget Sound Pulp & Timber Co., Mr. Turcotte is executive vice-president, and Mr. Evans is director and counsel of that company.

Douglas fir mills in the Pacific Northwest have more than trebled their output in the last 15 years, it is shown by a mill-

by-mill survey conducted by the West Coast Lumbermen's Association. In 1947 the output was 8,700,000,000 board feet from 1,505 sawmills, while in 1932 only 3,100,000,000 feet were cut by 383 sawmills. Lane County, Oregon, of which Eugene is the county seat, was the largest producer last year.

Fruit crops in the Northwest are expected to be materially below those of 1947, but slightly above the 10-year average. Peaches, pears, and apricots will be 20 to 25 per cent lower this year than last while prunes and cherries will show some increase. The Oregon-Washington-California pear bureau has estimated that the 1948 Bartlett pear crop in the three states will be 70 per cent of last year. Growers' prices for pears are expected to be 10 to 20 per cent above 1947.

Two super-phosphate fertilizer plants are to be built by Empire Chemical Corp. of Spokane, to use phosphate from the Maidenrock, Mont., mine. One plant will be at Spokane, the other at either Yakima, Ellensburg or Pasco.

Growth Slows Down

Population growth in Washington is slowing down slightly, according to a State Census Board report showing that towns and cities in the state gained 2.5 per cent in population between April 1, 1947, and April 1, 1948, compared to the average annual rate of 3.6 per cent for the period from 1940 to 1947. The State Employment Security Department reports that the number of employing units registered with the department showed an average gain of 150 a month from January 1 to May 1 this year, while last year the same months had an average increase of 515. On the other hand, new incorporations is slightly above last year — 513 against 493 for three months. The Seattle Chamber of Commerce's monthly survey of new and expanding industries shows capital expenditures of \$30,300,000 and 2,218 jobs created for March, April and May, 1947, while the same period this year showed \$7,400,000 and 364 new jobs.

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REGIONAL REVIEWS

THE WASATCH FRONT

Upper Colorado River States Nearing an Agreement

Satisfactory Division of Water in Sight, Since U. S. Reclamation Service Refuses to Undertake New Development Projects Without an Agreement

SALT LAKE CITY—At long last it begins to look as though the states of the upper Colorado River basin are going to be able to divide their share of the river system's water supply by compact.

After four years of preliminary maneuvering and two years of intensive negotiation, the upper basin compact commission had agreed upon a percentage division of the water. The agreement must, of course, be ratified by the legislatures of the five states involved and by the Congress of the United States before it can become binding. But in view of the ultimatum of the Interior Department that new projects cannot be undertaken until the water is divided, none of the legislatures are likely to balk.

Under the proposed compact the upper basin water would be divided as follows: Colorado, 51.75 per cent; Utah, 23 per cent; Wyoming, 14 per cent; New Mexico, 11.25 per cent; Arizona, which has a small area in the upper basin, the guaranteed use of 50,000 acre feet annually.

In order to reach an agreement, Colorado receded from two positions which were repugnant to Utah negotiators. One was that the division should be based solely on water contributed to the stream and the other was that the obligation to the lower basin and Mexico should be divided up and allocated to the individual states.

The basis of the division finally agreed upon was potential projects set up in the U. S. Reclamation Bureau's comprehensive report on the basin. As for downstream guarantees, the agreement makes the entire burden a joint upper basin obligation which must be satisfied before the upper basin division starts.

To provide the lower basin with the 7,500,000 acre feet annually which it is guaranteed under the seven-state compact, and Mexico 1,500,000 acre feet, which it is guaranteed by treaty, something like 30,000,000 acre feet of long-term storage will be required in the upper basin. This will be located principally in Utah on the main stem of the stream but, under the compact, will be the common reserve holding of the entire upper basin.

Barring extraordinary drouths, Utah negotiators figure that this state will get about 1,000,000 acre feet out of the deal, which will be enough for the proposed Central Utah project and a modest basin-wide development.

State Engineer Ed H. Watson, Utah member of the compact commission, figures that the state can benefit substantially in the way of water supply by power development on the Central Utah. He estimates that the power which would be made available by that key project would permit pumping and beneficial use of possibly as much as 500,000 acre feet which now wastes into Great Salt Lake.

The wartime small arms ammunition plant west of Salt Lake City is being developed into a major distribution center by three Salt Lake City investors who purchased the property from the government. Established wholesalers have leased large blocks of floor space in the buildings and negotiations are under way with prospective manufacturing tenants. Also under consideration is a housing project so that employees of the leasing firms can live close to their employment.

With a few minor exceptions, the war

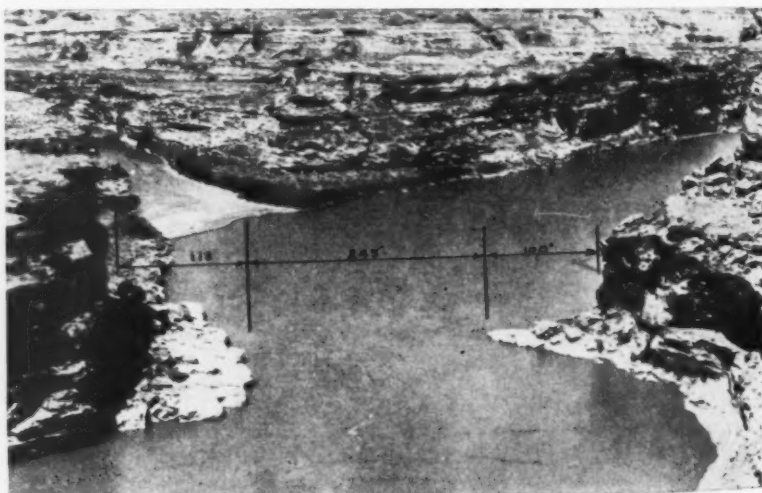
facilities built in this area have been or are in process of being absorbed into the peacetime economy. The transition has come faster, been more complete and has contributed more to the economy of the area than the most optimistic anticipated when the plants were shut down and placed on the market.

Utah Power & Light Co.'s recently announced \$61,000,000 expansion program for the next six years gives some hard-headed support to chamber of commerce forecasts of what is in store for the area in the way of business and industrial expansion.

In announcing plans to boost the company generating capacity from some 200,000 kilowatts to 340,000 kilowatts, George M. Gadsby, president, emphasized that the demand for that amount of electrical energy is not speculative but appears "to be in sight."

Major industrial factors in the power company calculations are steel fabricating, oil refining and fertilizer manufacturing.

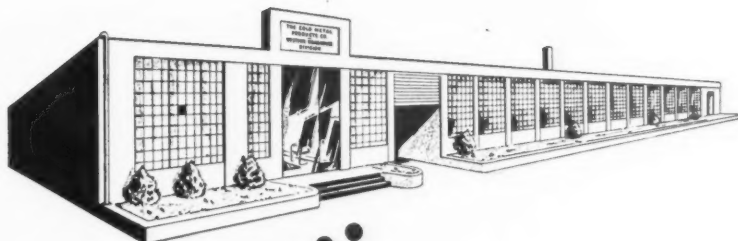
The new generating capacity will be in steam plants because no major hydroelectric developments are in prospect soon enough to take care of the rising load curve.



•Colorado River as it looks at Hite, Utah, where a bridge is proposed to reach Utah's southeastern corner with its many scenic natural bridges and cliff dwellings.

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LABOR and the INDUSTRIAL WEST

Idaho Apprenticeship Program Progresses

The apprenticeship program in Idaho has made fine progress through the joint apprenticeship committees in a number of towns, reports from Warren I. Cassidy, state supervisor for the department of labor, and the governor's apprenticeship committee reveal.

Gov. C. A. Robins acts as chairman of the committee. Members include J. W. Brennan, Pocatello, Idaho Chapter of the Associated General Contractors of America; William J. Hynes, Union Pacific Railroad, Boise; David S. Troy, Potlatch Forests, Inc., Lewiston; John Schoonover, Idaho First National Bank, Boise; J. B. Haffner, Bunker Hill & Sullivan Mining Company, Kellogg, president of the Idaho Mining Association, and Harry A. Elcock, manager, Amalgamated Sugar Company, Twin Falls, president of the Idaho State Chamber of Commerce.

Bar Association To Cover Labor Topics

A session of the American Bar Association in Seattle September 7 will be devoted to labor law and will be held in the Teamsters Union auditorium. W. Willard Wirtz, professor of law at Northwestern University, will discuss improving the administration of union contracts and Professor Nathan P. Feinsinger of the University of Wisconsin improving the process of collective bargaining. Chas. P. Taft, brother of Senator Taft, is another speaker. Archibald Cox of Harvard will talk on state legislation and Paul H. Sanders of University of California on wage and hour legislation.

Output Goes Up But So Do Costs

Output per man hour in mining operations has gone up since last year, but so have unit labor costs, according to Bureau of Labor Statistics. Their comparison is as follows:

	Unit Labor Cost (1929=100)	
	1947	1946
Bituminous Coal	172.8	153.1
Lead and Zinc (recoverable metal)	225.5	210.5
Copper (recoverable metal)	179.4	172.2
Iron	162.2	149.6

	Man-Hour Output (1939=100)	
	1947	1946
Bituminous Coal	120.8	114.2
Lead and Zinc (recoverable metal)	90.0	85.1
Copper (recoverable metal)	108.7	99.4
Iron	107.5	104.9

High Rate Of Wage-Hour Offenses

More than 96 per cent of the covered establishments inspected in the eight Western states during the fiscal year ending July 1, were found to be violating one or more provisions of the Fair Labor Standards Act (Federal wage and hour law) or the Walsh-Healey (public contracts) Act, or both.

Violations of the overtime provisions, requiring payment of at least time and one-half for all hours over 40 in any work-week, were uncovered in nearly 54 per cent of the inspected establishments.

Child labor violations were disclosed in more than 4 per cent, while failure to pay the statutory minimum wage of 40 cents an hour was found in 2½ per cent.

Employers agreed to pay \$319,289 as back wages to 6,945 employees scattered throughout the eight western states—California, Washington, Oregon, Idaho, Montana, Utah, Arizona and Nevada.

The figures for the fiscal year show 2560 covered establishments inspected, violations found in 2464, overtime violations in 1378 plants, minimum wage violations in 62 plants and child labor violations in 111 plants, according to John R. Dille, regional director of the Wage and Hour and Public Contracts Division of the U. S. Department of Labor.

"Child labor violations ranged from zero to nearly 20 per cent in the various states, and minimum wage violations ranged from less than 1 per cent to as high as 11 per cent," Director Dille said.

Wait For The Court

Settlement of the International Union of Mine, Mill and Smelter Workers (CIO) threatened strike against Kenecott Copper Company's properties in Utah, Nevada and New Mexico has resulted in the situation of an understanding to wait until the U. S. Supreme Court passes on the validity of the non-Communist affidavit requirement of the Taft-Hartley Act before either side takes any action on the matter.

The members of this union have gone back to work without a contract, but the company granted them the same 12c an hour raise retroactive to June 15 which Kennecott had given other employees who belonged to other CIO unions. Until this understanding was reached, the company had refused to deal with the union unless non-communist affidavits were signed.

Steel Problems?



Call Jorgensen First

IT'S too bad he never heard of Jorgensen—otherwise he would have the key to his steel problem. Whenever you too are barred from action by a steel problem, the key is in your hands if you can just remember to **CALL JORGENSEN FIRST!** No matter whether you are looking for a particular shape or form (steel, of course) or for a particular kind of steel—carbon, alloy, corrosion-resisting, abrasion-resisting, shock-resisting, hot-work, or any other special purpose steel—your best bet is to **CALL JORGENSEN FIRST.**



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THE WEST ON ITS WAY

ARIZONA

MINE EXTENDS PROPERTY—Tennessee Schuylkill Corporation, owners of the Tennessee mine near Chloride, have completed a lease and option arrangement for an additional 2,000 feet of the Johnny Bull-Silver Knight claim adjoining the Tennessee on the south. Productive life of the mine is expected to be lengthened many years by the new deal. Since 1894 it has produced about \$25,000,000 in lead and zinc.

MINING BOOM SEEN—As soon as two proposed 250-ton custom mills go into operation in or near Kingman, mining production in the area is expected to show a sharp increase. V. H. Hazen and W. J. Howard, operators of the Golden Gem mine, have been investigating a suitable site for the mills, which require adequate water supply. They also plan to operate a small truck fleet to haul ore from local mines to the mills.

NEW SMELTER GOING UP—Preliminary work has been completed before construction of a new smelter for Phelps Dodge Corporation at Ajo. Part of the plant equipment is being brought from the corporation's Clarkdale smelter, including a 450-foot smokestack. It will be dismantled sheet by sheet and re-erected at the new plant.

FLOTATION MILL PLANNED—Water and mineral surveys have been conducted preliminary to selecting the site for a 100-ton flotation mill planned by G. C. Moore and associates, of Chloride. To cost approximately \$150,000, the mill will be used for recovery of nine metals that are new to the area.

CALIFORNIA

WESTERN FIRMS GET ARAB OIL—Among the charter members of the American Independent Oil Company, successful bidders for petroleum rights in the "neutral zone" in Kuwait-Saudi Arabia, are Hancock Oil Co., Los Angeles; Honolulu Oil Corp., San Francisco; Los Nietos Company, Los Angeles, and Signal Oil & Gas Company, Los Angeles. Ralph K. Davies is president.

FABRICATING PLANT RETURNS WEST—Pacific Airline Equipment Company recently completed transfer of all equipment and personnel from Chicago to a new location at 3900 Burlos Ave., Burbank. Charles H. Toll, president, was formerly associated with Western Pipe & Steel, and United States Steel Products Company. The Burbank plant will handle a variety of production, fabricating and metal manufacturing operations.

FRESH EGGS FOR GUAM—The air between Oakland and Guam will be full of fresh eggs during the next few weeks, as Transocean Air Lines carries out its contract to deliver 45,000 dozen "hen fruit" for an island syndicate. First shipment was made recently, consisting of 7,050 dozen eggs.



NEW BUILDING FOR FLUOR CORP.—Believed to be one of the most advanced engineering buildings designed in recent years, Fluor Corporation plans construction of an addition to their main plant and office at 2500 South Atlantic, Los Angeles. This will allow unification of the Los Angeles staff which has overflowed into two downtown buildings. The new building will have 62,000 sq. ft. of floor space. The firm designs and constructs refining, chemical and other processing plants, and manufactures cooling towers, mufflers, gas cleaners and pulsation dampeners.



ENLARGES QUARTERS—San Francisco branch of The Foxboro Company at 266 Fremont Street has been enlarged to take in the entire building, doubling former capacity. The company, with main offices and factory at Foxboro, Mass., manufactures industrial instruments for measurement and control of process variables such as temperature, pressure, humidity and flow. Harry B. Brooks is manager of the Pacific District.

FROZEN FOOD PLANT—Don E. Wilcox is owner of a new frozen foods distribution plant opened recently across the street from San Francisco's Apparel City. With capacity for 1,000,000 pounds of frozen foods, the plant is equipped with automatic self-defrosting refrigeration machinery. Wilcox was head of purchasing in the eleven Western states for the War Foods Administration during the war.

HUGE HOUSING PROJECT—Plans have been completed for erection of 550 units in a low-cost housing project on the site of the old Crestmore ranch in Bloomington, San Bernardino county. Omart Investment Company, headed by M. Penn Phillips, is initiating the development, expected to cost about \$5,000,000.

MORE AUTOMOBILE PLANTS—The Cadillac Division of General Motors will establish four branch factory plants in California in early 1949, according to announcement by Sales Mgr. D. E. Ahrens. Cadillac plants will be set up in San Francisco, Oakland, Los Angeles, Pasadena.

MANUFACTURING ADDITION—Shank & Jurs, Berkeley, are spending \$150,000 to add 7,500 sq. ft. of manufacturing space adjoining their present plant at 8th and Carlton streets.

RHEEM BUILDS ABROAD—A plant covering 30,000 sq. ft. is nearing completion at Zaandam, Holland, where heavy duty, single trip and lacquer-lined drums will be produced by an association formed by Rheem Manufacturing Company and Evenblij Vatan N.V., a Dutch firm. The new company is named Rheem Evenblij N.V. Manufacturing and technical experience are being furnished by Rheem, with sales handled by the Dutch. Drum machinery for the new project has been shipped to the site from Rheem's Stockton plant.

WILLYS EXPANDS AT MAYWOOD—Assembly of two and four-wheel drive trucks will commence within the next two months at the Maywood plant of Willys-Overland, according to J. J. Welker, Pacific Coast general manager. Jeep station wagons will be on the assembly line also, by December. Plans have been approved to spend \$450,000 to expand the Maywood facilities, which will supply nine Western states. Employment will reach about 750.

JET ENGINE FIRM ACQUIRED—Controlling interest in Marquardt Aircraft Co., manufacturers of ramjet engines, has been purchased by General Tire & Rubber Company. They are presently operating the Aerojet Engineering Corp., Azusa.

NEW METAL PRODUCTS DIVISION—A variety of pressed metal products is scheduled for manufacture in a new division set up by Douglas Aircraft Co., Inc. Operating as an independent unit, the new division will turn out such non-aviation items as automobile fenders, radiator shells and other automotive parts. Harry Woodhead, former president of Consolidated-Vultee Aircraft Corp., heads the new division, assisted by A. W. Larsen, who was director of purchasing for Consolidated.

NEW FORGE—A new 12-acre site at Niles is the location of a plant being erected by the American Forge Company at a cost of approximately \$750,000.

OIL COMPANY LETS CONTRACT—Union Oil Company of California has awarded a \$70,000 contract to C. Norman Peterson, Berkeley, for extensive alterations in their compounding and packaging plant at the Oleum refinery.

PAINT FACTORY EXPANDS—Approximately \$160,000 is being spent by Doidge-Koren Paint Co., San Francisco, to enlarge their paint making facilities.

(Continued on page 80)

Building America's *New Horizons*



15-BILLION dollars worth of new building and another 7-billion for maintenance and repair work are 1948 goals of the construction industry. Advanced techniques and time-saving mechanical equipment, such as the ready-mix concrete truck unit pictured here, enable the modern contractor to build better in far less time than ever before.

FEW AMERICANS are ever out of sight of things built by the construction industry. Your home... the places where you work and play... the roads and streets you travel... all the things that make modern living possible are products of America's biggest business, next to agriculture — construction.



Accustomed to creating products with extremely long life, building contractors use high-quality, long-life equipment as a matter of course. They know the economy of quality trucks, designed for each particular job... and the expensive short-comings of a "bargain." That's why Super Power Whites are preferred

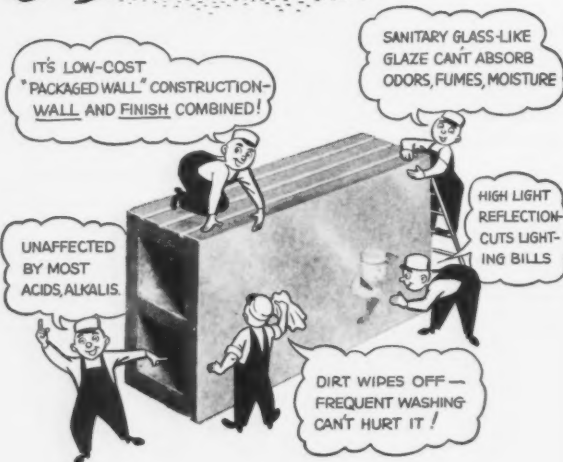
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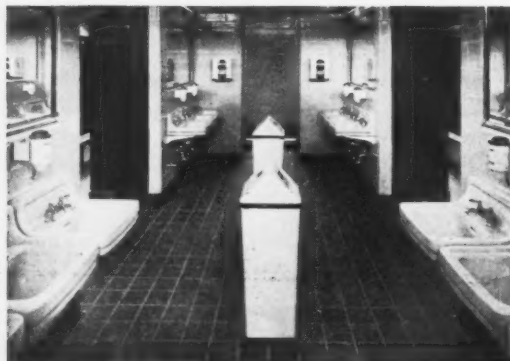
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September, 1948—WESTERN INDUSTRY

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THE WEST ON ITS WAY

(Continued from page 78)

NEW LOOK AT STANFORD—Construction work lasting 18 months has been contracted for by Stanford University, in a program which calls for conversion of the Administration Building into a new home for the law school. The new building will cost \$780,000, with built-in furnishings to cost another \$110,000.

MACARONI PLANT BURNS—A South San Francisco landmark was lost in the fire which swept through the Fontana macaroni factory, a division of Hunt Foods, Inc., with an estimated \$500,000 damage.

FACILITIES DOUBLED—Acquisition of the Los Angeles plant of Air Associates, Inc., by the Pacific division of the Parker Appliance Company will double the Western manufacturing capacity of the latter firm. H. E. Schroeder, Parker's Pacific division manager, will continue as head of operations. In addition to flared tube couplings and aircraft valves, the firm will produce a new gate valve and high pressure check valve to meet requirements of the 70-group military aircraft program.



WEST TO BUILD NEW NAVY SHIPS—The Navy Department has just announced its immediate postwar shipbuilding and reconversion plan. Contracts allotted to West Coast shipbuilders include the construction of two anti-submarine submarines at Mare Island, Vallejo, California, and the conversion of 13 other Navy ships, the work to be shared by shipyards at San Francisco, Long Beach, and Bremerton, Washington.

WANT A SHIPYARD?—The West Yard of Moore Drydock Company, Oakland, is scheduled for sale or lease by the War Assets Administration on September 13, when bids will be opened.

APPAREL SHOW SCHEDULED—Largest single market display of apparel ever held on the Pacific Coast is planned for San Francisco, November 7-10, with a joint showing by the Manufacturers and Wholesalers Association and the West Coast Salesmen's Association. The Hotel Whitcomb is site for the show, which will feature more than 1,000 lines of men's, women's and children's wear and accessories.

BAY AREA STEEL PLANT—Early construction is planned for a steel warehouse in San Leandro, for the Pacific Iron & Steel Company, Los Angeles. The firm deals in structural steel and fabrications, specializing in prefabricated steel buildings.

C-H SUGAR EXPANDS—Storage facilities for bulk raw sugar at their Crockett plant are being enlarged to take care of 90,000 tons, about 10 per cent of the annual Hawaiian sugar crop, it has been disclosed by officials of the California-Hawaiian Sugar Refining Corp. A total of \$3,000,000 is being spent on installation of steel storage tanks at Crockett and at Hilo, and on conversion of cargo vessels to handle the bulk raw sugar.

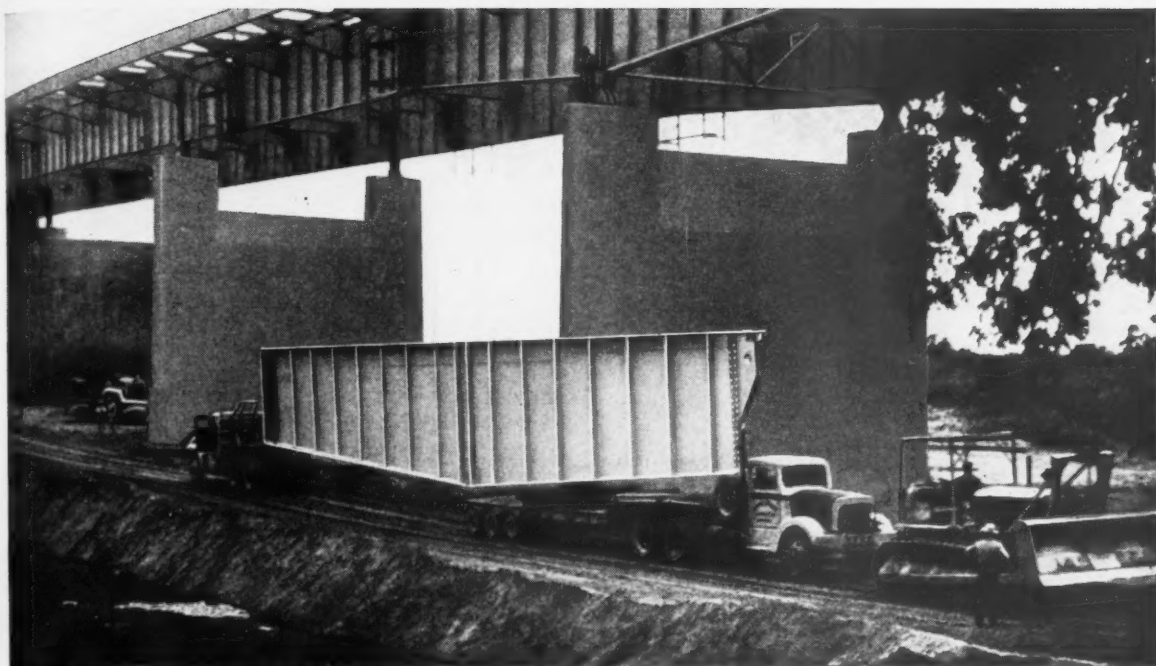
SHIRT FACTORY EXPANDS—Alard of San Francisco, manufacturer of men's sport shirts, has doubled its capacity by affiliation with a second plant. Production is expected to reach 50 dozen per day of current models, plus 20 dozen of a new line. Just closing its second fiscal year in business, the firm estimates its sales volume at \$400,000.

BREWERY MODERNIZES—H. H. Colby, president, has announced that the Aztec Brewing Co., San Diego, will spend about \$200,000 on a modernization program covering the next six months. Company was recently purchased by Tivoli Brewing Co. of Detroit.

POPULATION GROWS—California retained its place as third most populous state in the nation as of July 1, 1948, according to State Statistician Julian Riley. He placed California's population at 10,150,000, topped only by New York, with 15,000,000 and Pennsylvania, with 10,500,000. Riley predicted that California would pass Pennsylvania by 1950. Los Angeles county showed a gain of 45,000 during the past year, but San Francisco gained only 5,000.

MASONITE MOVES NORTH—Western divisional sales offices of Masonite Corporation, hardboard manufacturers, have been moved from Los Angeles to 111 Sutter St., San Francisco. C. H. Smith is division sales manager.

(Continued on page 82)



Unique construction methods are the outstanding feature of this new bridge across the Feather River near Marysville, California. Steel girders up to 93 feet long speed construction as they combine economy and efficiency with eye-pleasing design. Length of bridge over-all: 2,693'...Width: 66'...Maximum height: 70'.

Steel is building the West for Today...for the Future

Building the West is a job for steel. For the growing West can't wait. Steel's fabricating speed helps the West build fast. Steel's great durability helps the West to build to last.

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● It's all set to size in just 10 seconds to cut perfect pipe threads on 1," 1 1/4," 1 1/2" or 2" pipe. Workholder sets instantly—only 1 screw to tighten on pipe—no bushings. **RIGID 65R** is self-contained, no extra dies to haul around or lose. Fast accurate threads on iron, steel, brass or copper pipe or conduit, with surprisingly little effort. Every 65R is factory-tested—see test sample in each new tool. Buy from your Supply House.



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RIDGE OIL (Ridge Oil)
for better threads.

RIGID
WORK-SAVER PIPE TOOLS

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

THE WEST ON ITS WAY

(Continued from page 80)

BOX MACHINE FACTORY BOUGHT—Food Machinery Corporation, San Jose, has completed negotiations for purchase of the firm of Stokes & Smith, Philadelphia, makers of set-up paper box making machinery, filling and sealing machinery for non-rigid and rigid containers.

PARTS PROGRAM MOVES AHEAD — Western Mouldings and Stamping, Inc. is equipping a plant recently purchased at Ontario, for production of stainless steel mouldings, window channels and similar parts for the Ford Motor Company.

NEW SOAP FACTORY—The Stryker Soap Company has purchased property in South San Francisco for erection of a new factory, adjacent to the plant of the Metal & Thermit Corp. No date for the start of construction has been announced.

ICE CREAM PLANT—San Jose Creamery, Santa Clara, is going into production of ice cream in a new \$100,000 plant.

AIRCRAFT ORDERS—Four California aircraft factories have been awarded 64 per cent of military plane contracts recently placed by the government under the 70-group Air Force plan. North American, Lockheed, Northrup and Douglas will build 1,411 out of 2,201 planes ordered. Aggregate West Coast orders under the program totals 1,573 planes, the Boeing plant at Seattle receiving orders for 162. Employment is expected to increase about 16,000 within a year as result of the contracts.

COLORADO

MINERALS HUNT VIA AIR—A U. S. Geological Survey crew using an airplane and a magnetometer have begun exploration of southern Colorado's Wet Mountain valley in a search for mineral deposits. The magnetometer, carried below the plane on a cable, records magnetic impulses on graphs in the plane, and when these are coupled with aerial photographs and personal observations, experts are able to determine likely deposits. The area formerly produced both gold and silver.

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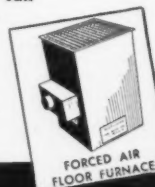
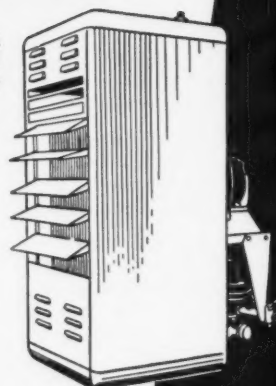
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FEATURES: 33 sq. ft. of heating surface in the 125,000 BTU model. New type burner gives maximum efficiency — is adjustable and replaceable. Heat exchanger is specially rolled of heat-resistant steel. New Basoid valve with line voltage Solenoid and 100% safety shutoff. Wall type Minneapolis-Honeywell thermostat. Powerful, silent fan has 16" blades. Case is 24-25 gauge Paint-lock enameled steel.

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CENTRAL STATES MFG. CO., INC.
ARKANSAS CITY, KANSAS

IDAHO

NEW SMELTER ORDERED—Construction contract for a smelter to cost \$1,000,000 at Stibnite has been placed by the Bradley Mining Co. with Western-Knapp Engineering Co. Plans call for completion by late 1949, to handle antimony and gold ores from the Yellow Pine mine.

MONTANA

TURBINES ORDERED—Four giant turbines to be installed at Hungry Horse Dam, fourth largest in the world, will be manufactured by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Contract calls for four 105,000 hp. 400-ft. head, 180 rpm. vertical welded steel spiral casing hydraulic turbines. The dam will be 520 feet high and 2,115 feet long, and is located on the south fork of the Flathead River southeast of Columbia Falls, Mont.

NEVADA

TRUCK FIRM INCORPORATED—Permission to issue \$1,000,000 in capital stock has been granted to the Republic Truck & Tractor Company, Reno. Incorporators of the new firm are all from Michigan. They are William W. Schenck, William O. Campbell, Benjamin Schenck and Herman M. Marquardt.

ORE MILL PLANNED—Construction of a mill with a 50-ton daily capacity is planned by the Broken Hills Mining & Milling Company on their property near Gabbs. In addition to silver the mill will be equipped for recovery of antimony, lead and zinc.

NEW MEXICO

NEW GASOLINE PLANT—Farmington has been selected as the site of a gasoline plant to cost \$1,000,000, to be built for the Southern Union Gas Co., Dallas, Texas.

OREGON

NEW SUBSTATION—A major step in development of power facilities in the Ranier area has been taken with the completion of plans by Pacific Power & Light Company to erect a 115,000-volt substation. Power will be obtained by a tie-in with the Bonneville Power Administration's Astoria transmission line under an arrangement worked out between the company and the government body.

DREDGE OPERATING—Gold dredging operations with the dredge formerly owned by L. R. Harris of Portland, have been started by new owners of the equipment, Brockton Nevada Mining Syndicate, of Brockton, Mass. H. D. Ramsey, Sumpter, negotiated the sale of the dredge, which has not been working extensively since the war.

BREWERY TO REOPEN—Production is being started at the Walla Walla Brewing Co. plant, which was closed for six months. The W. D. Bryan interests remain in control, having taken over the plant in 1944 from United Union Brewing Company. More than \$200,000 has been spent in modernizing the plant.

ALCOHOL PLANT SOUGHT—Negotiations are under way by a new organization, Industrial Alcohol, Inc., to lease and operate the former government-built alcohol plant at Springfield. James F. Morrell, lumberman, is temporary president and treasurer of the new firm. Wood waste will be utilized by the plant, which has a capacity of 5,950,000 gallons of 190-proof ethyl alcohol annually.

NEW FOOD WAREHOUSE—Construction is well along on a new 200-ft. warehouse in Portland for S.W. Fine Foods, Inc., under a lease agreement with L. Brugh, garage owner. The structure will cost approximately \$120,000.

NEW MOULDING PLANT—As soon as a plant site has been obtained at The Dalles, a new firm which will incorporate under the name of Columbia River Moulding Company is expected to start operations. Mouldings and other wood products are to be made from waste pine stock. Howard J. Hunt, Russell M. Ward, F. F. Phibbs and James E. Patterson are forming the company.

MAY OPEN OLD MINE—Frank Luedke, vice-president of Talisman Mining & Leasing Co., has announced that the old Laurier mine, near Laurier, Wash., may be producing in the near future. High grade copper was formerly taken out, but a new strike has been made on a shoot of steel galena.

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HOUSING EXPENSE
- ever*

RIGID economy guaranteed
... and you like its work-saver features, too

● The **RIGID** housing guarantee is just one of the reasons why the **RIGID** heavy-duty pipe wrench is the favorite of men who know fine tools—all over the world. Note the easier-work features: adjusting nut in open housing spins easily in all sizes 6" to 60"; handy pipe scale on hookjaw; instant-action non-slip non-lock jaws; powerful comfort-grip I-beam handle. No wonder **RIGIDS** are the most popular pipe wrenches made. You'll prefer them, too. Buy them at your Supply House.



RIGID
WORK-SAVER PIPE TOOLS
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HEAT TREATING

ROSS OVENS

1. Ross Infra-Red "Airay" Oven for Auto Body Touch Up
2. Ross Batch Type Shelf Door Oven
3. Ross Overhead Cross Bar Conveyor Oven
4. Ross Floor Pusher Conveyor Tunnel Oven
5. Ross Finger Bar Conveyor Oven for Metal Sheets
6. Group of Three Ross Batch Type Ovens
7. Ross Conveyor Type Wire Baker

Nearly 500 leading manufacturers of all classes of products requiring metal baking, treating, and curing, specify ROSS Ovens and equipment for their processing operations. Among these users are most of the world-famous makers of automobiles, aircraft, cans, household and office appliances, toys, trucks, wire, etc. Each ROSS oven is custom built to fit the job—expertly designed and constructed—to insure the utmost uniformity in process and product with accompanying savings in costs for fuel, operating, maintenance and floor space.

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THE WEST ON ITS WAY

NEW ALUMINUM USE—Decalcomania transfers made from aluminum foil 3/1000ths of an inch thick are being produced by C & H Supply Co., Portland. The process was developed by the Boeing Company, and patents are pending on the new process.

FWLER EXPANDS—Finishing touches are being put to the third expansion made by Fowler Manufacturing Co., opposite their main Portland plant at 2545 S. E. Gladstone. New facilities include a galvanizing division and a new restaurant.

FLOUR MILL CHANGES HANDS—Controlling interest in Crown Mills of Portland has been acquired by Centennial Flouring Mills Co., according to Moritz Milburn, president of Centennial. The mill will continue with the same personnel, and has a capacity of 5,000 hundred-weight per day.

NEW DRY KILNS—A \$300,000 expansion program has been announced by the Youngs Bay Lumber Co., Roseburg, to include eight new dry kilns, as well as cooling and dry sheds. The kilns, of concrete construction, 105x17½ feet, will be built by the Todd Building Co., Roseburg.

FIRM READIES LIME PROCESS—A syndicate headed by C. E. and E. H. Weston will establish and operate a new lime production plant in the Roberts Creek area, ten miles south of Roseburg. The plant is to have a daily capacity of 350 tons of agricultural and commercial lime, and operations will start within 90 days, it was announced.

NEW PAINT PLANT—Bids are being solicited for the construction of the Pacific Paint & Chemical Co.'s new plant, which will be located on N. Flint just off Broadway, Portland, and will include facilities for manufacturing, warehousing, offices, and showrooms.

PRODUCTION STEPPED UP—Addition of another briquet press to the facilities of the Portland Gas & Coke Company has been announced by Paul B. McKee, president. The new press is able to convert more than 300 tons of carbon into household fuel in 24 hours. The carbon is a by-product of gas-making.

Announcing

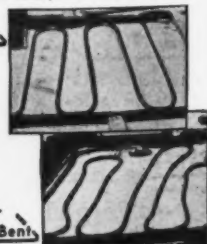
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Bend right on the spot, fast and accurately



Now, with this new light-weight machine that can be carried in one hand, you can speed-up radiant heating installations . . . for the Tal Tube Bender handles, without annealing, hard copper tubing as well as soft, both K and L, in all diameters from ¾" to 1" in all standard radii. Changeovers from one size to another can be made in 40 seconds. One man does everything without help. No flattening, no kinks, no wrinkles. Made and guaranteed by Tal, the world's largest exclusive producer of pipe and tube bending equipment. Write today for data bulletin.



Tal Bender, Inc. Dept. 6 Milwaukee 2, Wis.

FIRE AT CHINOOK—Two warehouses of the Chinook Packing Co., containing a year's canned salmon pack, were destroyed by fire recently, with an estimated loss of \$200,000 in fish products, cans and soybean oil.

BRICK PLANT EXPANDS—The Renton plant of Gladding McBean Co., purchased by the firm in 1927, is embarked on a \$1,000,000 expansion program which will include a new storage plant and new kiln, and add sewer pipe and chimney linings to the long line of clay products made there. Facilities will be enlarged 50 per cent, and 50 new employees will be needed.

NEW SAW MILL—Construction is under way on the new saw mill of E. W. Picco Logging Co., on the north bank of the Chehalis River near Montesano.

HARD BOARD PLANT—Anacortes Veneer, Inc., plans to erect a \$500,000 hard board plant in Anacortes. It will adjoin the present veneer plant and utilize waste products from there. Production is not expected to start before late 1949.

PILOT PLANT—Moonlite Mining Co., north of Colville, has installed a pilot mill for working the ore from a four-foot vein. First shipment of ore from the mining property netted \$180 a ton, according to H. J. McChelan, Spokane, who is president.

CEDAR MILL TO START—Operations are expected to begin this month at the Gulf Red Cedar Company's 80,000-ft. capacity band-saw mill at Central Point. Cedar will come from the Prospect area and will be shipped to Stockton, Calif.

UTAH

NEW ACID PLANT—Construction of a new \$6,800,000 acid plant at Garfield is planned by the American Smelting & Refining Co., to increase production from 200 tons to 700 tons daily. According to W. J. O'Connor, general manager for the firm in Salt Lake City, construction may not be completed for two years because of material shortages.

CONVERSION NEARS END—Nearly half of the plate mill conversion project at the Geneva Steel Plant of U. S. Steel has been completed, according to a recent announcement. Work is expected to be finished early in 1949, giving Geneva facilities for production of hot strip steel in coils, in addition to plates and structural shapes now made there.

For Contractors and Industry GOODALL "SUBWAY" AIR HOSE



AIR HOSE TAKES A BEATING!—That's why sturdy hose such as Goodall "Subway" with its wrapped duck construction, oil and moisture resistant tube, and tough red jacket lasts longer. It's designed to resist gouging, abrasion, and rough usage. Next time get SUBWAY, the air hose recommended for all pneumatic tools including concrete breakers, rock drills, rivet hammers, chipping hammers, etc. Sizes from 1/2" to 1 1/4" in 50' lengths. Write for literature.

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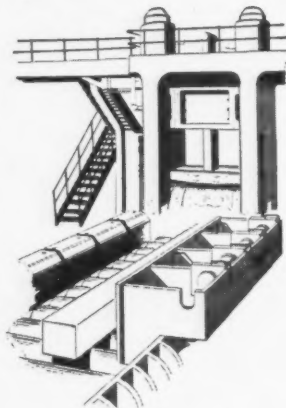
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Blooming mill power cost cut 3¢ per ton

BY reducing friction at the roll necks through positive lubrication, a Farval centralized lubricating system can save thousands of dollars a year in power costs.

On one 40" blooming ing mill, for example, the records show that power cost per ton of steel rolled was lowered 3.1¢ by installing Farval. On the basis of tonnage rolled, it took less than 3½ months for the Farval system to pay for itself.

Farval was installed to automatically lubricate the bearings on both the blooming mill and the tables, all motor driven. Power is supplied by the company's own plant, at ½¢ per kw-hr. Here are the vital "before and after" figures:



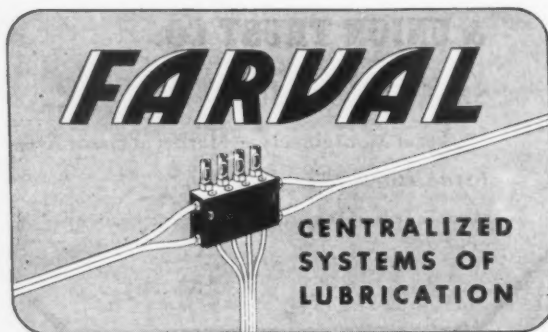
FARVAL—Studies in
Centralized Lubrication
No. 91

Method of lubrication employed	Cost of power for one year	Tons of steel rolled in year	Power cost per ton of steel
Roll necks hand packed . .	\$42,300	470,000	\$0.090
Centralized lubrication . .	\$37,170	630,000	\$0.059
Saved in power cost per ton with Farval . . .			\$0.031
Total power saving on 630,000 tons rolled . .			\$19,530
Total cost of Farval installation			\$ 5,500

To measure the full value of Farval, to the savings on power should be added the savings in labor of oiling, the savings in lubricant, the increased life of bearings and the increased tonnage produced through the elimination of mill delays and shut-downs for bearing replacement.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, at regular intervals. Farval is the Dualine System with the Positive Piston Displacement Valve. This valve has but two moving parts and is fully adjustable, with a Tell-tale indicator at each bearing to show the job is done. For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3269 East 80th Street, Cleveland 4, Ohio.

Western Offices: Seattle, San Francisco, Los Angeles



THE WEST ON ITS WAY

COKE PRODUCTION RECORD—The Kaiser-Frazer coke ovens, Columbia, recently set a record for production when 736 tons of coke was turned out in one day under the direction of Pete Connell, superintendent. Even larger volume is expected as soon as all ovens have been lighted, according to Connell.

MINING OPERATIONS EXPANDED—Kennecott Copper Co. and U. S. Smelting, Refining & Mining Co. will drive a new four-mile tunnel with the portal near Lark, several miles southeast of Bingham Canyon, where the present Niagara tunnel is located, with a view to extending open pit mining operations in the Bingham, Utah, area.

EQUITY TESTING FOR OIL—Equity Oil Co. is handling operation of a major test for oil being made in the eastern Utah Uintah Basin, which is being financed jointly by Equity, Paul Stock, Cody, Wyo., and J. T. Johan, Glenwood Springs, Colo., with the Ashley Valley Oil Co. to receive 4 per cent royalties from any production resulting from the test. The Weber sands are being tested at approximately 4,500 feet.

WASHINGTON

CARNATION EXPANDS—Construction is under way on a \$400,000 addition to the Spokane plant of the Carnation Company, with Central Construction Co. handling the general contract, James Smyth Plumbing & Heating, the mechanical contract, and Power City Electric Co. doing the electrical work. The building will house the milk processing equipment now located in the old building, which will continue to house refrigeration, storage, offices and ice cream plant.

IRON ORE FOR JAPAN—First shipment of what will be, in aggregate, the largest shipment of iron ore in history, has left via Long Beach, Calif., for Japan as part of the MacArthur recovery program. Total ore scheduled to go will be in excess of 400,000 tons, according to E. J. Amar, port manager.

C.B.&I. ADDS TO SHOPS—Contract has been let for construction of a \$325,000 shop building and overhead crane runway at the Salt Lake City plant of the Chicago Bridge & Iron Company. According to Manager A. N. Hopper, work on the 125 by 420-foot building and 20-ton crane will require 10 months to erect. American Bridge Company will do the job.

PLASTICS FIRMS MERGE—Two Seattle plastics manufacturers, Durable Plastics and Olympic Plastics, have recently completed a merger, with operations combined at the Durable plant at 315 No. 36th Street. Operators of the new firm, which specializes in acrylic signs and acetate packaging, are Henry H. Gray, Warren P. Jensen and David Bridgeman.

NEW REEFERS ADDED—Great Northern Railway has delivered some 1,500 new refrigerator cars to Western Fruit Express Company, a subsidiary to be used in handling the 1948 Western fruit crops. The cars have an all-steel exterior and are equipped with air circulating fans. About 1,200 cars of cherries and apricots were expected to be moved to eastern markets from the Wenatchee area this season.

SURPLUS PURCHASED—Last Army and Navy surplus in the Alaska area has been bought by a combine of five Seattle salvage companies. Valued at \$5,000,000, the property consists of jeeps, trucks, tractors, machinery and clothing, and is being brought to Seattle from Artu in the Aleutians. Pacific Coast Associates, Inc. is purchaser, including the Alaska Junk Co., Dulien Steel Products, Inc., Pacific Tractor & Equipment Co., Tieton Metals Co., and California Bag & Metals Co.

INDUSTRIAL PROPERTIES SALES • LEASES

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Up-to-the-Minute Lists

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— Appraisals —



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VANCOUVER BANK—New quarters for the Vancouver branch of the Seattle First National Bank are expected to be ready for occupancy in late 1949, on property located at 11th and Main streets, known as the Wall block.

FERROALLOYS PLANT BIDS MADE—Two bids for operation of the Rock Island ferroalloys plant near Wenatchee were received by the War Assets Administration. The Keokuk Electro-Metals Co., Keokuk, Iowa, offered \$382,000 for operation of the unit in place and the American Chrome & Magnesium Industries, Inc., Washington, D.C., offered to lease the plant for a five-year period on terms of 5 per cent of the gross sales, with a specification that they have option of extension of lease for three additional five-year periods.

NEW PORT ANGELES POWER PLANT—Port Angeles is asking for bids on a diesel auxiliary generating power plant to supply needed electricity until Bonneville power arrives in 1949, when the new plant will serve as a standby plant for emergencies and to reduce peak loads during winter months, according to Finance Commissioner E. C. Steele. The plant's cost is estimated at \$90,000 installed, with tentative site on city-owned property at Second and Valley.

WEYERHAEUSER ACQUIRES TWO FIRMS—Directors of Weyerhaeuser Timber Co. have approved plans to bring the Snoqualmie Falls Lumber Co. and the Grandin-Coast Lumber Co. into the Weyerhaeuser organization, it was announced by J. P. Weyerhaeuser, president, the merger also having been approved by directors of the other two concerns. Plans are to operate the Snoqualmie company's holdings—two large sawmills, a planing mill and other logging facilities, including 141,000-acre tree farm, as a direct branch of Weyerhaeuser without change in personnel.

PLYWOOD FIRM REORGANIZED—Tacoma Plywood Corporation, with headquarters at 600 E. 15th Street, Tacoma, has completed its reorganization program, installing additional machinery and equipment to supplement its annual capacity of 24,000,000 square feet of plywood, the president of the organization announced. Continuous operation is now expected, with a contracted supply of veneer.

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WESTERN

TRADE WINDS

NEWS ABOUT THOSE WHO DISTRIBUTE AND
SELL INDUSTRIAL EQUIPMENT AND MATERIALS

Hixson & Jorgensen, Inc., Advertising is the new name of the Los Angeles agency formerly known as Hixson-O'Donnell Advertising, Inc.

Willamette Motor & Supply Co., Portland, takes on the Oregon and southern Washington distributorship of Motowlift fork trucks, manufactured by Service Caster & Truck Corp., Albion, Ohio. Kit Conners is president of the new materials handling equipment firm.

A. George Stern has been appointed Western sales representative for Heyden Chemical Corporation, with offices at 420 Market Street, San Francisco. Mr. Stern was formerly with Westvaco Chemical Corporation. Larger offices and warehouse facilities are planned for the West Coast in the near future, according to the Heyden Corp. announcement.

The American Brass and Copper Sales Company, Oakland, has been named distributor for special aluminum mill products manufactured by the Reynolds Metals Company. These include wire, rod, bar, rolled structural shapes, forging stock, tubing, and pipe.



At a recent board of directors meeting, Carl A. Lyon was appointed to the vice-presidency of I. F. Schnier Company, Inc. Mr. Lyon, associated with the firm for many years, will continue to serve as general manager.

Willys-Overland Motors plant at Maywood, Calif., will assume distributorship of their cars in California October 1, replacing Transport Motors Co. J. J. Welker is Pacific Coast manager for Willys-Overland.

Arizona Machinery Company, Phoenix, appointed exclusive Arizona distributor of Mater sawmill equipment produced by the Mater Machine Works, Corvallis, Ore. The line includes hydraulic carriage drives, sawmill carriages, edgers, saw husks and parts.

Goebel-Pratt Company appointed brokers in Oregon for the Holly Sugar Corporation. The company already represents Holly in Washington, and will maintain offices in Portland at 622 S.E. Grand Ave., as well as Seattle, Tacoma and Spokane.



Ed M. Lepper, formerly traffic manager in the New Mexico - Texas area for Trans World Airline, has been appointed district passenger sales manager for TWA in Los Angeles. He has been succeeded in the Albuquerque office by R. B. Riordan, who was moved from the district managership at Denver.

Val W. Detling, formerly with Firestone Tire & Rubber Co., has joined the sales staff of the Huntington Division of the W. J. Voit Rubber Corp., Los Angeles. A specialist in merchandising rubber products, Detling will work on new lines of rubber floor tile and garden hose planned by Voit since the firm acquired the Huntington Rubber Co.

Truck Owners Association of California appoints Larry M. Fites managing director.

A. V. Mattingly has assumed the post of executive representative of the Parr-Richmond warehousing division of Parr-Richmond Terminal Co. He was formerly with the Haslett Warehouse Co.

William F. Fiedler has been appointed to the Northern California staff of the Ira G. Perin Company, to work on the firm's hand lift truck and conveyor accounts in the Bay area.



Robert Dill named superintendent of new installations and service for refrigeration, air conditioning and Diamond soot blowers, for George E. Swett & Co., Engineers, San Francisco. He replaces Henry Buffalow, resigned. H. J. Wickert and John Marsh continue as sales manager and chief engineer.

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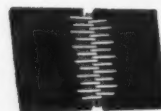
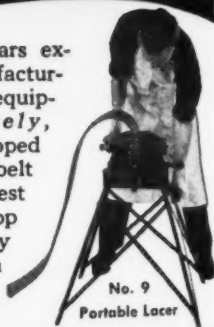
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CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2, MICHIGAN



Million Hour Award For General Pete

Marking the establishment of a safety record of 1,180,000 man hours of work without a disabling injury, covering a period of 211 days, an American Petroleum Institute "One-Million Hour Certificate" was recently awarded the Torrance, California, refinery of General Petroleum Corporation.

The award climaxes a new safety program plan initiated by the company's manufacturing department in February, 1947. At that time, full responsibility for accident prevention was turned over to a foremen's safety committee and 18 workmen's safety committees. How well and enthusiastically these groups performed their tasks was reflected in the API's 1947 report of injuries which showed that, out of 36 large companies reporting, the General Petroleum group had moved from their previous average safety standing of twelfth, up to second place.

Unusual significance attaches to the safety mark in that, during a 10-week period, each unit was shut down and overhauled as part of an electrical conversion program from 50 to 60-cycle power. During this period, employees were exposed to many more hazards than normally experienced in their work. Study and preparations were made by the safety committees that resulted in not a single disabling accident and only a minor number of first-aid injuries during the conversion period.

Under the G.P. plan, all operating personnel and crafts in the refinery are represented on the safety committees and to them is entrusted the work of devising safety practices, recommending policies and disseminating safety information to their fellow workers.

Shale Drilling Program Planned in Colorado

Diamond core drilling operations will be carried on this summer by the Union Oil Company of California and the Pacific Oil Company, a Standard Oil Company of California subsidiary, northwest of Rifle and Grand Valley, Colo. Working in conjunction with the U. S. Bureau of Mines, some 11 holes are scheduled in efforts to determine the extent and character of western Colorado's immense shale deposits. Exploration will be carried on by the oil companies on properties they hold in the area.

Bay Area Industries Show Big Advances

New and expanded facilities for San Francisco Bay area industrial plants topped \$14,000,000 in June, according to a report by the San Francisco Chamber of Commerce. Eighteen new projects were started in counties around the Bay, valued at \$871,000, while 22 expansions had an estimated value of \$12,858,500.

FOR THE RIGHT ANSWER...

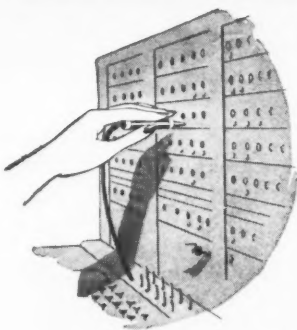
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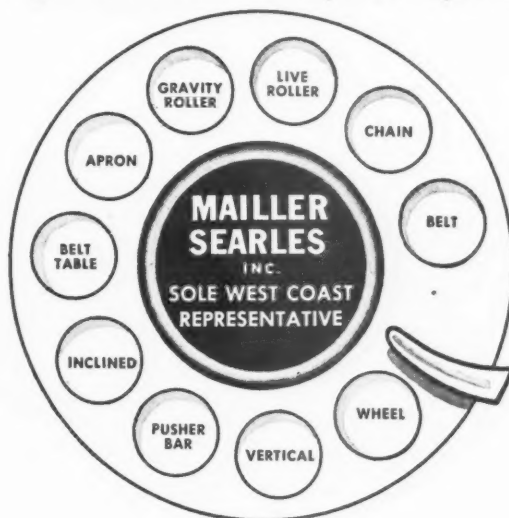
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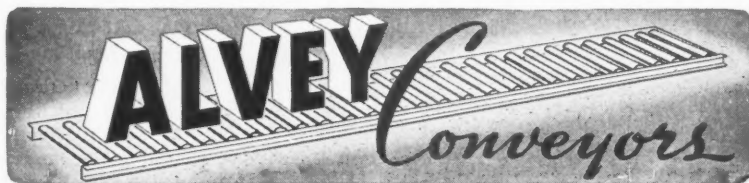
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NEW METHODS, MATERIALS, EQUIPMENT

802



Paper Cups Carry Safety Messages

Coffee and caution in equal doses to help keep workers both refreshed and alive is the mission of a new line of hot drink cups made by Continental Can Company. Each time a worker pauses for a cup of coffee, he is confronted with one of a series of cartoon characters and a brief safety message. Color and typography are varied so as to keep up employee interest, and in case the customer so desires, the cartoon character can be shown dressed in the safety equipment typical to the industry—Wilson & Co., meat packers, have the little man wearing an apron guard, steel mesh hand gloves, a safety helmet and metal scabbard.

803



New Electric Tractor Has Dual Controls

Specifically designed for towing trailers used for order assembly in warehouses, Rocky Mountain Steel Products, Inc., has developed a new dual control tractor as part of their "Pony Express" line of electric trucks. The Ira G. Perrin Co. has been appointed Northern California distributors for the entire Pony Express line. The new tractor, illustrated here, may be controlled from either side of the machine with the operator walking or riding.

804



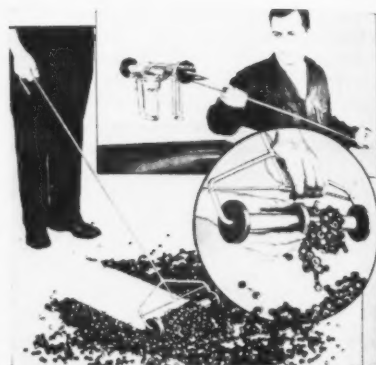
Brown Industries Makes New Aluminum Flooring

Latest engineering development in aluminum alloy by Brown Industries, Spokane, Wash., is a corrugated flooring for trailers and truck bodies, marketed under the name of "Coralite." The material is .091 in. thick, with a 3/4-in. corrugation, and is fabricated without seams. Features of the product, aside from its light weight, are that it is splinter and moisture proof, and can be easily sterilized for handling perishable cargoes. Washing and steam cleaning remove all taints from body interiors, allowing milk, fish and meat to be carried interchangeably. According to the manufacturer, the Coralite has a relative rigidity of a 1/2-in. aluminum plate, but weight is only 25 per cent. A 35-ft. trailer floor, using Coralite, has a theoretical uniform load carrying capacity of 36,000,000 lbs.

805

Rotary Magnet Requires No Wires or Electricity

New loading and releasing principles feature the line of non-electric Multilift Rotary Magnets now in production. The unit consists of a metal tube mounted rigidly between Neoprene wheels in a carrying frame, with Alnico permanent magnets

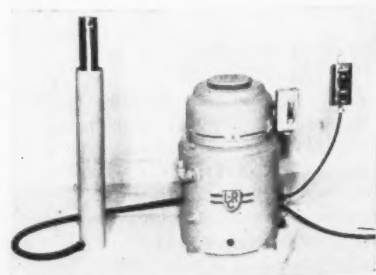


sealed in the tube. The rotary feature provides greater pick-up surface than the conventional type with only the under side magnetized. Unloading is accomplished by pushing Neoprene wiper ring to a non-magnetic area at one end, where the load drops off. May be used for retrieving from tanks, separating ferrous from non-ferrous materials, picking up steel from floors, nails from parking lots or cleaning tramp iron from conveyors.

806

Hydraulic Pump Is Compact Unit

Originally designed for use with their hydraulic High Light Trucks and Sheet Feeding Tables, engineers of the Lyon-Raymond Corporation, 5909 Madison St., Greene, N. Y., have found so many other uses for their electric hydraulic pump that it has been put on the market as a package unit by itself. It is designed to deliver 1 1/2 gallons of oil per minute and develop a pressure of 1,000 p.s.i. A flange-type motor is mounted directly on top of the oil reservoir, and while the reservoir has a 2 1/2-gallon capacity the entire assembly is only 18 1/4 in. high by 12 1/2 in. in diameter. A wide combination of motors, pumps and controls can be furnished, as well as a variety of styles of hydraulic cylinders to adapt the unit to different types of use.



New 'Scotch-Weld' Film Bonds Metal to Metal

A film of pure adhesive known as "Scotch-Weld" has been introduced by the Minnesota Mining & Manufacturing Co., reported to provide a metal-to-metal bond resistant to shear tests up to 3,500 pounds per square inch. The material, which comes in rolls like tape and is not tacky to the touch, is placed between the units to be bonded and cured by the simultaneous application of heat and pressure — 300 to 500 degrees from five to 60 minutes, with 25 to 100 pounds pressure per square inch, depending upon the type of bond desired. Scotch-Weld looks not unlike cellophane, but it is 100 per cent adhesive, with no supporting material. It may also be used to bond metal to fibre, wood and plastic surfaces. It is inert to water, oils and most solvents.



808

New Paint Stripper For Use on Metal Surfaces

A recent development by the laboratories of Oakite Products, Inc., is a specialized cold solvent material that permits fast, thorough removal of paint and similar finishes from metal surfaces. It is known as Oakite Composition No. 15. The manufacturer reports the product is effective in removing baking japans, wrinkle finishes, nitrocellulose lacquers, and synthetics such as alkyds, phenolics, ureas, vinyls, etc., with no attack on the metal. Application of the composition may be by swabbing or brushing, or by tank immersion, followed by hot pressure-rinse to remove loosened paint particles.

809

Compact New Counter Has Single Action

The Ohmer Corporation, subsidiary of Rockwell Manufacturing Company, is in volume production on their type 82-A single control register. Operated by a lever on the right side, which may be moved by hand or by any mechanism having a reciprocating motion, the new counter has two sets of figures, the upper ones counting to 999 before returning to zero (may

be returned to zero at any time) and a lower set giving a grand total, accumulative up to 99,999. It may be fitted with a bell to ring at each operation. Ohmer Corp., Box 998, Dayton, Ohio.

810

Reynolds Metals Makes Aluminum Nails

Six types and 16 different sizes of aluminum nails have recently been introduced by Reynolds Metals Co., Louisville, Ky. They are reported to have sufficient strength for any purpose and are suitable for use with most types of building materials. An advantage over common nails is that they weigh one-third less than steel nails, giving the purchaser three times as many to the pound. While costing slightly more than conventional nails, the aluminum ones are not subject to rust or corrosion, giving a saving in repainting or discolored spots.

811

New Screwdriver Has Replaceable Bits

A screwdriver with interchangeable bits capable of driving either slotted or Phillips screws is a recent development by Stanley Tools, New Britain, Conn. The driver, No. 88, has a hollow handle compartment containing two Phillips screwdriver bits and one for slotted screws. The chuck, or bit holder, is an improvement on the well-known principle of the taper shank engagement. A bit is inserted in the chuck and then tapped on a piece of wood to secure it in place. By rapping the bar near the tip lightly, the bit is released.

812

Soldering Iron Heats By Chemical Cartridge

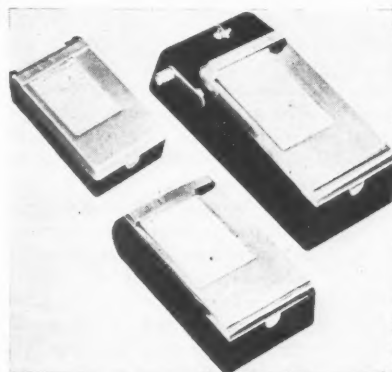
A new type of soldering iron known as the Quik-Shot utilizes a chemical cartridge, fired by means of a plunger in the handle, which is reported to reach working heat in five seconds and maintain it for from six to 10 minutes. A compound of metal

powders and an oxidizing agent are contained in the cartridge, and when ignited the heat developed is almost 200 watts. This iron is especially handy for use where no electric outlet is available or where the use of a blowtorch is not desirable. It is produced by the Kemode Manufacturing Co., New York.

813

New Line of Registers Has Major Improvements

First of a completely new line of automatic registers to be introduced since 1941 has been announced by UARCO, Inc. The new registers were styled by Robert D. Budlong, eminent Chicago industrial designer, and embody numerous mechanical and structural improvements, although put on the market at prices lower than UARCO's previous line. Four new items, three of which are illustrated here, are the Recorder, Manifold, Featherweight and Recorder-Cashier. The Recorder refolds and locks in the bottom copy, while the Manifold issues all copies. The Featherweight is a portable type, made of aluminum and black plastic — the others are of heavy gauge steel — and has an easily operated aluminum clip trap for filing office or shop copies. The UARCO Cashier automatically opens the cash drawer only after the ticket has been written and copy refolded into the locked compartment.



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Reading Guide For Western Management

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

Why Men Work

By Alexander R. Heron. Stanford University Press, Stanford University, California, 1948. \$2.75.

Many men in management are familiar with Alexander R. Heron's first book: "Sharing Information With Employees." This book was years ahead of its time and has presaged much current written material on the subject. "Why Men Work" is likewise ahead of its time — particularly in the sense that it will shake the traditional beliefs and opinions of many men in management. Management's typical belief in the imaginary and illusory line between itself and the working force; its cherishing of certain powers of decision as "prerogatives" — these are the types of ideas which Alexander Heron vitiate by sheer force of logic.

A superficial examination of "Why Men Work" would lead one to conclude that it consisted of a collection of short chapters, seemingly covering separate, unrelated, and often unfinished ideas. A thorough study, however, reveals that these separate ideas are part of a central theme, that they represent separate and distinct challenges to straighter management thinking. Further, one soon realizes that the short chapters, the simple yet succinct sentences and paragraphs make for rapid reading and clear understanding. Also, once read, the book will be re-used time and again as a management handbook, for reference to particular subjects as covered in the separate chapters.

"Why Men Work" analyzes many of management's past failings, clears some of today's misconceptions, and presents a number of opportunities for the future. It provides a reasonable and practicable approach to the important problem of building effective teamwork in American business. It raises some fundamental issues for management; it brings out points which many authors have hesitated to discuss. In the author's own words: "If management as a system is to continue to be the American system, then management as people must learn fundamentally why men work — and do what must be done to enlist the willing, effective work potential of sixty million workers."

Certainly this is a message to Western management from a man who has been so long a part of Western management.

Reviewed by:

JOSEPH M. TRICKETT
Dean, School of Management

How to Chart

By Walter E. Weld. Codex Book Co., Inc., Norwood, Mass., 1947. \$3.00.

Anyone who is confronted with the problem of telling a story based on sta-

tistics should use a chart. In the words of Allan C. Haskell, who wrote the preface, "Graphs provide the quickest and clearest way of getting facts from figures." Here we have an entire book devoted to principles of construction and use of charts. The presentation is in a clear, readable style frequently absent in technical works.

The need for such a book as this is great because there is much room for improvement in the general quality of graphs. Surprisingly few good references are available, since most authors of business statistics books include only one or two chapters on chart construction. It is exceptional to find an entire book devoted to such material.

One of the book's strong features is found in the chapter devoted to ratio charts. As contrasted with the ordinary or arithmetic chart showing amounts of change, the ratio chart shows percentage of change. Variations in percentage of change are more significant than variations in amounts of change. For instance, if production volume is increasing, are production costs changing at the same rate or at a different rate? A ratio chart will give an answer to this question by inspection. Thus, an executive who understands the use of ratio charts has a more useful tool at his disposal. Only through a complete understanding of both kinds of charts will the full benefits of graphical presentation be obtained.

The author gives careful consideration to the charting of stock market statistics and their relation to the forecasting of general business activity. At the present he doubts the wisdom of using these data for such a purpose, because current business activity is influenced to so great an extent by government policy. Regardless of this situation it is universally agreed that an accurate forecast of business conditions will constitute the greatest single aid to efficient management. Good chart technique will always enhance the value of a forecast.

Additional features which appear to be noteworthy are a chapter on good and bad exhibits and one on how to begin the construction of a chart. The former can be used as an aid in determining the value of the finished product. Students learning the art of drawing graphs will profit most from reading the latter chapter.

Reviewed by:

WESLEY T. BENSON
Accounting and Business Statistics

Briefer Guides From The Management Library

Wages in California:

War and Postwar Changes

By Nedra B. Belloc. Institute of Industrial

Relations, University of California, 1948 (pamphlet).

This study of wages in California from 1940 to 1947 describes wage levels as they existed in 1940 and changes in average hourly earnings from 1940 to 1946. Adjustments are made for rises in the cost of living and in taxes to indicate real earnings.

New Controls for Fixed & Variable Costs

American Management Association. Production Series No. 178, 1948 (pamphlet).

Organizing for efficient production and effective cost control. Production control as a cost reduction tool. The cost reduction program at Republic Steel. Flexible budget for overhead factory expense.

Materials Handling:

The New Word in Industry

An article in "Fortune," June, 1948.

Materials handling covers the movements of materials through stages of manufacturing, storage, and distribution. Managements are discovering that by mechanizing materials handling they can cut their costs and at the same time increase production. This article discusses and illustrates ingenious new tools for efficient materials handling.

Decentralization in Industry

National Industrial Conference Board, Studies in Business Policy, No. 30, 1948 (pamphlet).

Decentralization is being considered by many companies as a possible method of operating more efficiently. Based on reports from 148 large manufacturers, this study analyzes current trends. Consideration is given to geographic dispersion of plant facilities rather than to managerial decentralization, although the two often go together.

Ford Issue—Purchasing

"Purchasing Magazine," July, 1948.

The July issue of "Purchasing" is devoted entirely to the Ford Motor Company's purchasing organization. In addition to a wall-size organization chart showing the positions and functions of 370 individuals, there are 200 pages describing purchasing policies, practices, and procedures.

Patterns in Fringe Benefits

By A. C. Croft. An article in "Personnel," July, 1948.

Marginal benefits have become part of the wage structure of American industry. Voluntary social service plans and vacations average almost 9 per cent of total payroll. Employer contributions to private pensions and welfare funds more than tripled between 1942 and 1946. On the basis of a National Foremen's Institute study of 473 union contracts, the author describes patterns that are developing with respect to 10 major types of fringe benefits.

Building Quality Into Manpower

American Management Association. Production Series No. 179, 1948 (pamphlet).

Use and results of attitude surveys. A case story in committee management. The selection of executives and the supervisory staff.

Reviewed by:

BERNA M. CARLSON
Management Librarian

HELPFUL LITERATURE

For the plant operator
who wants to keep informed

2421

Odor Control Booklet—Benefits to be gained from use of specialized cleaning, disinfecting and deodorizing materials in connection with industrial housekeeping and plant sanitation programs are described in an illustrated, 12-page booklet just released by *Oakite Products, Inc., New York*. Two products are dealt with, *Oakite Di-Sanite*, reported as an all-purpose cleaner having effective deodorizing ability, and *Oakite Tri-Sanite*, containing germicidal and fungistatic properties in addition to odor-killing and light detergent characteristics.

2422

Diesel Engine Manual—Application of diesel engines in such diverse activities as crushing plants, sawmills, ice plants, grain and feed mills, water pumping stations, compressors, work boats and refrigeration plants, are described in a new publication by the *Caterpillar Tractor Co., San Leandro, Calif., and Peoria, Ill.* Booklet, entitled "Caterpillar Diesel Engines and the Work They Do" may be obtained by writing to the Peoria plant.

2423

Operator's Guide—A new and revised edition of their *Operator's Guide* has just been issued by *Towmotor Corporation, Cleveland, Ohio*, manufacturers of fork lift trucks, tractors and accessories. In addition to providing clear, concise instructions for the safe, efficient operations of a fork lift truck, the guide includes sections on standard fork lift truck accessories and their operation, and suggestions for handling materials and containers of all types.

2424

Western Pine Publications—A new and revised schedule of publications has been issued by the *Western Pine Association, Portland*, listing 77 books, booklets, stuffers, laboratory notes, mat proof sheets, technical bulletins, etc., designed for use as dealer aids, educational material and reference manuals. Most of those listed may be had without charge in single copies. Schedule lists quantity prices and charges for imprinting.

2425

Waterproof Connectors—Dimensional data on the three sizes of type "W" waterproof connectors manufactured by *Cannon Electric Development Company, Los Angeles*, as well as photos of underwater geophysical applications are contained in a revised and enlarged edition of their Bulletin W-248. Booklet is six pages, and includes typical insert arrangements and tabular data "AN" layouts in shell sizes Nos. 16, 22 and 36 adaptable to "W" shells.

2426

Hard Surfacing Electrodes—A new booklet, DH-45, has been issued by the *Page Steel & Wire Division of American Chain & Cable Company, Inc., Monessen, Pa.* It contains detailed information about five grades of electrodes developed by Page to provide a weld metal deposit whose particular properties are suited to a definite welding application. An exclusive Page electrode, the Special Manganese Nickel Shielded Arc electrode, is fully discussed. This type is reported to contain no free carbides and is air-toughening, requiring no quenching in water.

2427

Electronic Bulletin—Application of the new proportional current-input electronic pyrometer controller is described in a new bulletin issued by the *Bristol Company, Waterbury, Conn.* The

device is designed to proportion the current input to electrically heated furnaces, ovens, plastic molding machines, salt pots and similar equipment. Bulletin is identified as No. PB1237.

2428

Material Handling News—Stressing the importance of objectivity in surveying industry's materials handling needs, the current issue of the *Material Handling News*, published by the *Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.*, presents a detailed description of its electrical battery-powered fork trucks and their use in fields to which they are best suited. Case histories include accounts of operations in citrus-fruit, heavy machinery, cold storage and other industries.

(Continued on page 94)



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2429

Industrial Glass Products—Glass products for signal, technical and industrial purposes are described in a new 24-page book issued by *Kopp Glass, Inc., Swissvale, Pa.* Two sections entitled "Glass Engineering" and "Production Quality Control" tell a picture story of manufacturing, designing and testing at the Kopp plant, which produces color filters, industrial lenses, instrument covers, sight glasses, signal lenses, etc.

2430

Continuous Flow Conveyors—A circular in color giving information on the Greer Multi-Tier has just been issued by the *J. W. Greer Company, Cambridge, Mass.* The device discussed is a mass-production conveyor system using trays that are held always in a horizontal plane on roller chains. As products are placed in the trays they move on to the next process or may be carried back and forth in overhead, unused space depending upon required waiting time.

2431

Crane Handling—"Crane handling" instead of "man-handling" is recommended by the *Thew Shovel Co., Lorain, Ohio*, one of the world's largest manufacturers of power cranes and shovels, in their new booklet entitled "Lorains in Industry," which pictures the Lorain cranes in their many phases of materials handling operations. The illustrations show both rubber tire and crawler mounted cranes, and illustrate the use of 15 typical attachments such as clamshell buckets, dragline buckets, electric magnets, hooks, slings and tongs. The booklet consists of 16 pages, and emphasizes the manner in which cranes in materials handling cut down on manpower while expanding storage space.

2432

Weatherproofing Protects Exteriors—Entitled "Lasting Protection for Metal Surfaces," a new, 12-page, illustrated bulletin describing a recent development for protecting outdoor structures against weathering has just been issued by *The Arco Company of Cleveland, Ohio*, and *Los Angeles, Calif.* The bulletin explains how their new metal primer provides a tough, pliable, weather-resistant, water-repellent coating for use on both new or uncoated metal structures and over previously cooled surfaces that "seals out" measurable moisture, vapor and chemical gases and fumes. The booklet should be of interest to maintenance superintendents, engineers, plant managers and other plant executives. Seven typical applications for its use are given.

2433

Cartoning Machine Explained—*A. H. Ross Company, Inc., Dayton, Ohio*, have issued a circular and folder illustrating and describing a number of the features of the Ross automatic and semi-automatic machines for packing commodities in cartons. The circular is entitled "Ross Cartoning Machines Save Time, Money and Labor" and contains many photographs of the machines' uses and many features, such as its code dater and printer, tuck flap imprinter, faulty carton detector, corrugated liner inserter and carton uprigger. The operating range of the semi-automatic model is described as from 100 to 200 cartons per minute.

2434

Precision Castings—A technical data book on Precision Castings by the Lost Wax Process has just been issued by *I. Shor, New York*, for whom *Elliott A. Allen, Los Angeles*, is a representative.

2435

No Ribs; No Screws; No Nails—"3M Adhesives in Industry," new booklet put out by *Minnesota Mining and Manufacturing Co., St. Paul, Minn.*, pictures bonding operations such as plywood-to-metal and vinyl-sheeting-to-wood; sealing operations involving aircraft cabins, auto bodies and boat decks and protective and anti-corrosion coatings for metal. The 28-page brochure is of help to industrial users in choosing the right adhesives, sealers and coatings, and contains 40 pictures, 18 case histories and 26 of the more than 1,000 formulas of the company's Detroit adhesives and coatings divisions.

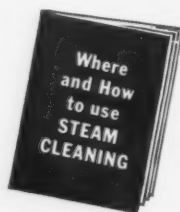
2436

Louvered Ceiling Lighting Systems—A smartly designed new book describing their "Sky-Glo" lighting system has been issued by the *Benjamin Electric Mfg. Co., Des Plaines, Ill.* The manufacturer terms this louvered ceiling lighting as the most important development in the field since the fluorescent lamp, and the new book details the specifications and applications of "Sky-Glo" for office, plant and schoolroom use.

2437

What Makes a Plant Fire-Safe?—The *Associated Factory Mutual Fire Insurance Companies, Boston, Mass.*, have answered this question in a 16-page illustrated booklet they recently published. Each page deals with a separate feature of the overall problem, and the broad principles governing construction standards, automatic sprinklers, water supplies and extinguishers are covered, as well as the essential requirements of a good watch service and firefighting organization. The causes of industrial fires are detailed, with ideas for their elimination and suggestions for good plant housekeeping.

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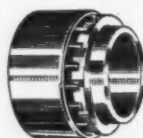
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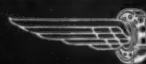
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MECHANICAL KINKS

By W. F. SCHAPHORST, M.E.
Former Engineering Instructor
New Mexico State College

Bell-Bearing Pointers

This writer has had experience with ball bearings in various ways for nearly 50 years and he now confesses that even he himself is becoming amazed at the remarkable performance of modern types. When first introduced — on bicycles — ball bearings were considered a "delicacy," and they were rather delicate. But today they run on and on, under most severe conditions.

For example, a test was conducted — over five years of continuous operation — at 3,600 rpm. — with a load on the bearing of 25 pounds. The total revolutions during that time amounted to a staggering 11,000,000,000 — eleven billion in other words. Did that wear it out? Not by any means. The testing engineers stated that it was still good for many more thousands of hours of continuous running — many more billions of revolutions.

Ball bearings should not be allowed to become too hot, but don't be alarmed if they become warm. Sometimes the grease itself is the cause of the warmth. Thus when a ball bearing starts up the grease is cold and it takes time to warm up the bearing sufficiently to thin the grease enough to be expelled from the contact and rotating parts. Then after that happens the temperature sometimes actually reduces. Therefore to add lubricant to a warm bearing can often be a mistake as there is such a thing as "too much" lubricant. Adding lubricant can make the bearing warmer. The right kind of lubricant is also important. If there is anything that deserves the best lubricant obtainable it is ball bearings.

Bottle and Can Openings Wrong

Now and then steps in the right direction are taken and then, suddenly, everything seems to go haywire.

The old ketchup bottle, for example, had a neck that was so small that a bottle would hang around a restaurant for years. It was impossible to get any of the ketchup out of the bottle — almost.

So someone decided to make ketchup bottle necks larger and as a result ketchup manufacturers are selling much more of the condiment than they did in the small bottleneck days.

But that is no reason why all bottles should have larger necks — or all tin cans. Yet the trend is in that direction and this writer doesn't like it.

As an example, I bought some benzine the other day and I noticed immediately that the can in which it came is equipped with a neck more than twice the diameter of previous necks. I didn't give it a thought at the time, but when I came to use the benzine and tried to pour some of it out,

I spilled more of it than was transferred into the bottle into which I was trying to pour it. The old neck is much better and is amply large. The new neck is TOO LARGE — unnecessarily large.

Benzine and gasoline, when spilled, are dangerous. It is more important that the neck of such cans or bottles be right than that the neck of a ketchup bottle be large.

More thought should be given to such details as these before making changes.

Efficiency of an Airplane Motor

The above question is frequently asked, and the writer finds that the answer is not well known, not even among engineers. So the writer decided to take it upon himself to attempt to give a fair answer.

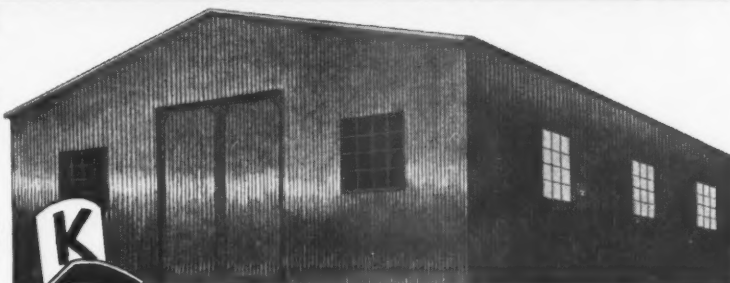
Brake thermal efficiencies of aircraft engines depend somewhat upon the engine speed and the degree of super-charging, both of which affect the mechanical efficiency. Normal full throttle mechanical efficiencies vary in the range of 85 to 90 per cent.

A secondary factor in the variation of thermal efficiency is spark advance. This

(Continued on page 97)



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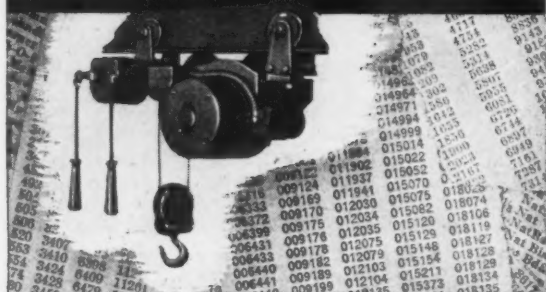
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Silicone News



IN BLIZZARD OR HEAT-WAVE...

Fortunately for men and machinery, blizzards come in season. We have time to prepare for them with heavier clothes and thinner lubricants. But it is not practical to change lubricants in aircraft that take off in tropical heat and fly into sub-zero weather, or in the parking meters that line the main streets of cities and hamlets from the Yukon to the Rio Grande.



Photo Courtesy Mi-Co Meter Division, Michaels Art Bronze Co.

Dow Corning Silicone Oil, DC 550R lubricates 8 moving parts and enables Mi-Co parking meters to give trouble-free service the year around.

The problem in such cases is to find a lubricant which does not run out when hot, thicken when cold, or gum up with age. That's why many manufacturers like the Mi-Co Meter Division of the Michaels Art Bronze Co. Inc., of Covington, Kentucky, are using DC Silicone Oils or Greases.

Mi-Co Meter required a lubricant that would not thicken or thin out enough to alter the performance of parking meters exposed to temperatures ranging from -40° to 150° F. Field testing under the sun of California and in the blizzards of Fairbanks, Alaska proved that one of our silicone oils, DC 550R, was superior to any other lubricant tested. Now all Mi-Co Meters are factory lubricated with DC 550R.

Dow Corning Silicone Oils and Greases are used in a wide variety of applications from automatic toaster timers to 6 inch roller bearings exposed to temperatures up to 700° F. If your lubrication problems involve high or low temperatures, weathering, or a combination of all three, phone our nearest branch office or write for data sheet CS-9X on DC Silicone Oils or data sheet D1-X on DC Silicone Greases.

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In England: Albright and Wilson, Ltd., London



(Continued from page 95)

can change the thermal efficiency as much as 10 to 12 per cent. Using the 85 per cent full throttle mechanical efficiency of an aircraft engine would be approximately 33 per cent. At low spark advance settings and the same mechanical efficiency the brake thermal efficiency would be roughly 30 to 31 per cent.

All of which means that 30 to 33 per cent of the heat energy contained in the gasoline is converted into actual mechanical energy, which in general is considered "very good." Large condensing steam power plants don't do much better. In other words, very roughly, about one-third of the heat is utilized in a modern aircraft engine.

Stanford Research Facilities at L. A.

Facilities of the Stanford Research Institute, a non-profit agency devoted to solving research problems of industry, have been extended to Los Angeles.

Dr. A. M. Zarem, 31-year-old former chief of the electrical section in physical research at the U. S. Navy's Pasadena Ordnance Test Station, will be head of a staff of 15 at SRI's Los Angeles office.

Typical Los Angeles projects, Dr. Zarem reported, include cause, sources and possible controls of smog; economic aspects of aircraft industry expansibility in an emergency; and evaluation of detergents.

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Yet Lamson Tubes are surprisingly low in cost. In many plants they pay for themselves in less than two years. In one plant, they saved \$150,000.00 the first year.

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Chrysler Not Encouraging

AS FAR as actively encouraging industry on the West Coast to engage in the manufacture of automobile parts is concerned, and taking the steps to achieve definite results which the Ford Motor Company found by experience were necessary, little apparently is to be hoped for at present from the Chrysler Corporation.

At the Stanford Business Conference in July conducted by the Graduate School of Business of Stanford University, K. T. Keller, president of Chrysler, held a press conference. When asked by a representative of *Western Industry* at this press conference whether Chrysler would do as Ford has done about helping to develop parts manufacturing on the Coast, he said:

"I heard they had a big show out here, a big circus."

When his attention was called to the fact that Ford had stationed men on the Pacific Coast to help educate Western manufacturers in fabricating parts, and that much missionary work had been done, he said:

"Oh, we don't do it the Russian way. We don't believe in these four-year plans or five-year plans."

When the statement of a close observer of Chrysler operations was read to him,

to the effect that there had been no policy passed down by Management to Purchasing which would differ in any respect from any normal purchasing policy, he said:

"We consider it better to work at it intelligently, and do it on the basis of economics," and enlarged on this statement by referring to the immense cost of dies.

He also stated that they preferred to do their work first and their talking afterward.

Mr. Keller said he had been familiar for five months with the plans of Douglas Aircraft to set up a department or subsidiary to engage in metal fabricating, and with the fact that Douglas had been experimenting with fenders and radiator shells.

"They are attempting to do this work with kirksite dies, which we don't use any more," he commented. "Kirksite dies are not economical on a large volume of work, and the result means transferring a lot of it into hand work after it comes off the dies."

While in the employ of General Motors and at the Chevrolet assembly plant in Oakland in 1921, he said that his encouragement of California Cotton Mills to investigate automotive possibilities led to the rise of the National Automotive Fibres Company.

He finally opined that he was "glad to see these things come," referring to the development of parts fabrication on the West Coast. But as for anything more definite than that, not a word.

Just before leaving the press conference, Mr. Keller remarked that the Ford Company were "very charming people and we like them very much."

Management School Courses Offered

Two advanced executive seminars are being offered primarily for business executives this fall at the School of Management, Golden Gate College, in San Francisco. One is on the prevention and adjustment of labor disputes, under Glenn Bowers of the California Department of Conciliation, the other on top management problems under prominent San Francisco executives.

The schools of management and accountancy offer both day and evening courses, while the law, traffic management, insurance and advertising schools hold evening classes only. School of Management evening classes open September 13, day classes October 11.

Make Safety Record

The Chevrolet plants in Oakland, producing passenger cars and trucks, have won the second quarter award in the 1948 Chevrolet Safety Contest, reports Dale D. Douglass, plant manager of the Chevrolet Oakland division of General Motors Corporation. They did not have a single lost-time accident in that period.

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WESTERN INDUSTRY

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Western Firms Receive Potato Flour Orders

As a part of the Government plan of feeding distressed European countries, large contracts have recently been placed for manufacture of potato flour from potatoes bought from farmers under the price support program. Numerous Western processors have received contracts, including the Boltz Corporation, Los Angeles, 50,000,000 pounds; J. R. Simplot Co., Boise, 20,000,000 pounds with an option to make an additional 15,000,000; Puccinelli Packing Co., Turlock, 5,000,000 pounds; Valley Evaporating Co., Cowiche, Wash., 800,000 pounds and an option of 400,000 pounds more; Idaho Processed Foods, 5,000,000 pounds and an option to make an additional 3,000,000.

Potatoes are being sold by the government at 9 cents per pound to processors, who will receive 7 cents per pound for the potato flour.

Benefits Denied

The state of Washington denied unemployment benefits to 4,543 persons in May because of their participation in labor disputes, either because of association with strikers or failure to go through picket lines. Employees of manufacturing plants forced to close because of shortage of logs due to the boom strike were not denied compensation.

Sodium Sulfate Plant

Industrial Enterprises, Inc., Seattle, is reported to have purchased the Washington Chemical & Salt Co.'s sodium-sulfate plant at Monse, Wash. The plant will be modernized, production expanded and Industrial Enterprises will market a refined product for use in the new detergent-soap industry.

Retail Outlets Gain in California

A study issued by the State Board of Equalization reveals that, as of March 31, 1948, there were 273,185 retail outlets in California, compared with 255,378 a year ago, an increase of 7 per cent.

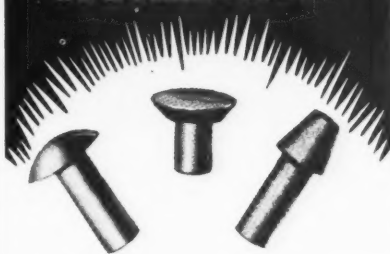
If proof were needed that California is a highly motorized state, it is to be seen in the fact that of the total outlets listed as paying retail sales taxes, 39,375 were classed as service stations, garages and auto supply stores.

Suggestions Rewarded

Theo Northcutt, employee at the Avon refinery of Tide Water Associated Oil Company, is becoming something of an habitual prize winner. He has just been awarded a special prize of \$1,500 for submitting the best suggestion in the three divisions of the company in 1947, bringing his total for the year to \$2,100. He had previously been awarded \$100 and then \$500 for 1947, and had won others in 1941 and 1946. The company did not disclose the nature of Northcutt's prize-winning suggestion.

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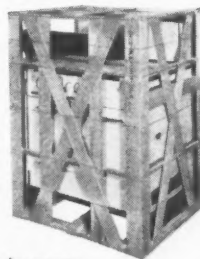
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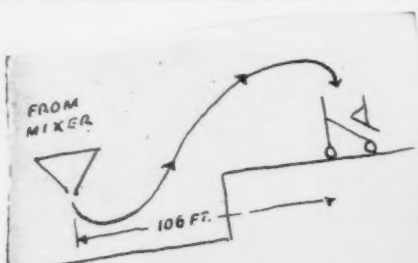
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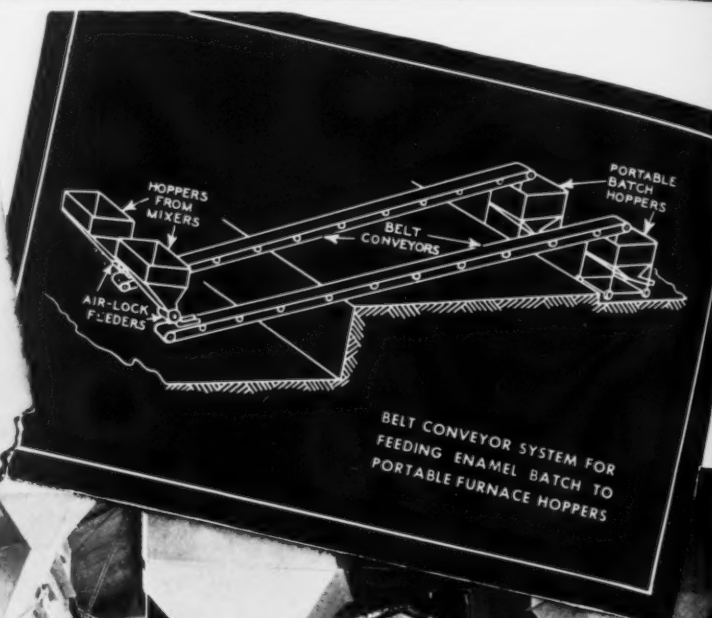
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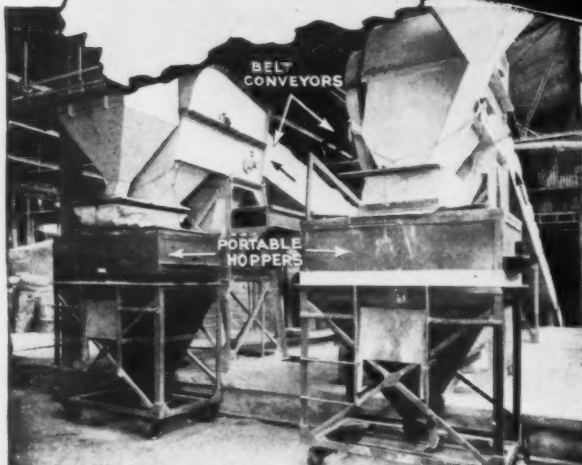


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